

# Railway Age

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## Overs and Shorts

ONE of the most expensive items in the handling of less-than-carload freight has always been exceptions, such as overs and shorts. Until recently, these have been regarded as a necessary evil, about which nothing could be done. However, so far as local freight station operations are concerned, the Central of Georgia, the St. Louis-San Francisco and other roads have proved that something can be done about it. Their records of savings in this regard, as cited in previous issues of the *Railway Age*, show that with education and careful supervision, much can be done to eliminate this annoying expense. Progress is also being made in the reduction of exceptions on freight interchanged at large terminals. By means of one centralized matching bureau for the entire terminal, the railways entering Cincinnati and Cleveland, among other cities, have been able to make remarkable showings. Agents of all roads submit their reports of overs and shorts to the matching bureau, where they are checked. In a surprising number of instances, the exception is cleared up, whereas, without the services of the bureau, a claim for loss would result. Last year one of these centralized matching bureaus cleared up more than 70 per cent of all exceptions reported in the terminal and some of the others have done nearly as well.

## More Car Miles Per Car Day

THE problem of securing more miles per car per day in freight service, as analyzed recently by a car department superintendent, hinges on general and intensive consideration of the following fundamental factors: Continued improvement in the design and construction of new cars; retirement or rebuilding of weakly constructed cars, many of which are still in service; replacement of low capacity spring draft gears with adequate modern gears; periodic inspection and repair of all draft gears, accompanied by gear removal at the time of inspection; thorough internal and external inspection of all cars before placement for specific loading; more general classification and commodity carding of cars to minimize delays; closer observance of A. R. A. loading rules, particularly as relates to lading on open top cars; thorough inspection at originating and intermediate terminals, at present not always possible because of too limited time allowed with the force of inspectors available; more general provision for the repairmen or the inspectors themselves as these defects are discovered in transportation yards; education of shippers to remove dunnage from cars as soon as unloaded. Much could be written about each of these factors which, taken together, have a vital bearing not only on "average car miles per car day", but on general railway operating efficiency.

## Power Switches at Siding Save Time

AN average saving of more than 30 minutes per freight train has resulted from the installation of two low-voltage power switch machines at the ends of a passing siding located on the top of a hill with approach grades of one per cent or heavier in either direction. The character of the traffic over this line had lately been of such a nature that it had been found impossible to stop heavy trains for meets at this siding, which condition was corrected after the power-operated switches were placed in service. An examination of the dispatcher's train sheets for this district shows that the average road time of tonnage freight trains has decreased more than 30 minutes per train. The superintendent of the division on which these new facilities are located has expressed so much enthusiasm over the results achieved that his road has recently ordered similar equipment for installation at three other points.

## Average Costs

THE last line of defense of the advocates of cost accounting for railroads is the "average cost". In its place and properly used by the well informed, an average cost can serve a useful purpose. To illustrate: A railroad officer, fully cognizant of the practical conditions and understanding the make-up of the average which he undertakes to apply, can often use it intelligently and effectively. Utilized by those who do not fully understand it, however, the average may, all too frequently, become misleading rather than informing. An attempt to base railroad rates on average costs would be, to use the language of the graph, an effort to eliminate the "peaks" and "valleys". The fact is that those peaks and valleys continue to exist, and their erasure, through the average, would produce merely fallacy. From the standpoint of business and economic conditions generally, the use of average costs for determining the reasonableness of a specific railroad rate is unjustifiable.

## The Reading Electrification Program

PLANS as now developed for the electrification of the Reading Company's Philadelphia, Pa., suburban lines involve an expenditure of \$20,000,000 in the next three years, covering the electrification of 49.9 route miles including 110 miles of track and the purchase of 100 multiple unit car equipments. An 11,000-volt alternating current overhead contact system will be used. The frequency of trains will be increased and the running time will be reduced from 20 to 25 per cent. All electric and steam trains will stop at the new North Broad Street station now under construction which will have underground connections with the

Broad Street subway. The project as a whole anticipates a growing population and the ability of electric traction to compete with all other forms of transportation. This expectation is supported by the experiences of other roads which show that under similar circumstances, electric operation will markedly increase real estate developments along the electrified lines and will increase traffic to a still greater degree.

### *Co-Ordinating Rail and Private Automobile Travel*

A NOVEL plan to induce automobile tourists to use its lines for journeys between centers of their interest has recently been inaugurated by the Southern Pacific. This road has developed and placed in service an automobile baggage car which enables the passenger to check his automobile with the same convenience that his trunks and other luggage are checked. The tourist who wishes to be relieved of long tedious drives between scenic or other points of interest, but desires to use his automobile at his destination, is thus suitably accommodated. A similar plan was recently inaugurated in Great Britain when the London & North Eastern established a special low rate for the transportation of tourists' automobiles on passenger trains between scenic centers of England and Scotland. The Great Western in England also provides similar service. The Southern Pacific service is now available on its "Del Monte" train between San Francisco and Del Monte, Cal. It seems possible that the plan is capable of wide extension here in the United States where distances are great between points of renowned scenic interest. Railway officers, therefore, will undoubtedly watch the Southern Pacific's experiment with great interest.

### *Electric Power Contracts*

FACTS brought to light at the recent convention of the Association of Railway Electrical Engineers indicate that there are few railroad activities in which savings can be made as readily as by improving electric power facilities. One railroad has engaged the services of a man whose duties consist entirely of inspecting and supervising power contracts. The results of his work have many times over paid for his salary. An example of how this is possible is illustrated by one case in which power was purchased for the operation of air compressors. About twice a year it became desirable to draw on these compressors for a period of a day to the limit of their capacity. In this case the cost of power depended on total demand and maximum daily demand. As a result the road was obliged to pay a demand penalty during a whole year for a heavy load which occurred on only two days of the year. The condition was corrected by changing the method of using air and assurance of this change was made by installing a demand limiting device. Many other experiences show that constant checking of the earned power rate, usually controlled by total consumption and peak demand, will disclose numerous ways to correct faulty operating conditions and to stop power leaks.

If all roads did as much to check power contracts, it

would mark a distinct forward step. It would familiarize the staff with the many different forms of contracts in use and would facilitate a comparison of costs between purchased and generated power. Having accomplished these results, the railroads could compare notes; a thing which was apparently impossible at the recent A. R. E. E. meeting. Finally it would permit railroad associations to discuss the question of power contracts with associations in the power industry. The National Electric Light Association has agreed to draw up a standard form of power contract on the basis of which power could be sold to all railroads. There are many difficulties in the way of such an innovation, but it would undoubtedly operate to the benefit of both the power producer and power consumer. A common understanding of the problem on the part of the railroads, effected by a study and comparison of their own contracts is an essential step toward this desirable arrangement.

### *Transverse Fissures Can Now Be Located*

ON August 25, 1911, a passenger train on the Lehigh Valley was derailed near Manchester, N. Y., killing 29 passengers and injuring 62 others. The investigation of this accident showed that it was caused by the failure of a rail, which broke into 17 pieces. Examination of this rail brought to light a new type of failure, which has since come to be known as an internal transverse fissure. Following this accident similar failures have occurred on other roads, notably that on the St. Louis-San Francisco at Victoria, Miss., on October 27, 1925. Few roads have been immune, and while most of the failures have been without loss of life, the fact that they cannot be detected until collapse occurs makes them a constant menace, the magnitude of which it has been impossible to determine with any degree of certainty.

Because of the seriousness of this type of failure, railway engineers, rail manufacturers and government agencies have given a great deal of study to the problem since 1911, working more or less independently. Their results were largely contradictory and provocative of controversy. Until about two years ago there was little agreement among students of rail manufacture and service regarding the cause of these failures. About this time, however, the American Railway Engineering Association, which is also the engineering division of the American Railway Association, perfected an arrangement with Elmer A. Sperry, an outstanding scientist and electrical engineer, whereby he undertook the development of a machine for this association, to detect and locate these fissures in rails as they lay in track. The success of this development has now been demonstrated, for, as related on a following page, the equipment that has been built has proved its ability to detect fissures to the satisfaction of the A. R. A., and has been accepted. It is now in daily service checking the condition of rails in important main tracks.

The development of this equipment constitutes an outstanding achievement in the transportation industry. By detecting the presence of fissures, it makes it possible to remove them from the track before failure occurs, thereby eliminating a menace to travel which gave promise of becoming exceedingly serious. Fur-



thermore, by reason of the ability of this equipment to determine the relative size of fissures within rails, successive readings should indicate whether this form of failure is progressive and, if so, the rate of growth and the conditions promoting it. With such information, it should be possible to determine the cause of transverse fissures and also to develop the necessary measures for their elimination, which is, of course, the ultimate objective.

In the meantime, the operation of this car is being watched with intense interest because of the light that it is shedding on the relative prevalence of transverse fissures. Some students of this subject have feared that this form of failure will be found to be so numerous as to require the immediate replacement of tremendous quantities of rails and the continued operation of trains only under serious hazard until new rails can be secured and laid. Others have estimated that the number of defective rails will be found to be as low as one per cent of the rails in track. While any conclusions based on a study of less than 200 miles of tracks may be subject to wide error, it is reassuring to note that the first results on this limited mileage showed defects in only 0.06 per cent of the rails examined. In other conditions, although each individual transverse fissure is cause for serious concern, first information indicates that their prevalence is far less than had been feared in many quarters.

## Strengthening Old Bridges

THE assignment of heavier power to an engine district invariably raises the question of the strength of the bridges, and almost always imposes the problem of determining whether certain structures of limited capacity should be replaced or strengthened. If a bridge in question is of obviously unbalanced design, such that the low carrying capacity is owing to the disproportionate weakness of a few members, it is usually possible to reinforce these members at a material saving over the cost of a new bridge. Strengthening an old structure even at relatively high expense, has also been found profitable in the case of high viaducts or other structures of such a character that a complete replacement would involve serious interference with traffic. There have also been cases where a most extensive repair or reinforcement of an existing structure over a navigable stream has been found advisable because, by so doing, it has been possible to avoid the construction of the far more expensive structure which would be required to meet the demands for greater span lengths, vertical clearances, etc., imposed by waterway authorities.

There are, however, definite limits to the economies which may be expected in reinforcing an old bridge. The cost per ton of steel applied in reinforcing is many times that of new bridge steel. Furthermore, the efficiency of steel so added, is not equal to that of the steel in a new bridge. That is, generally speaking, an old reinforced bridge of a certain weight is not as good a bridge as a new one of the same weight. Taking these considerations into account the bridge engineer of a large western railroad has found that old truss spans of moderate length can usually be replaced for less money than the cost of strengthening, taking into account the scrap value of the old steel, or in some cases, the value which may be given to the added useful life that can be obtained from the old span by re-erecting it at a stream crossing on some minor branch line.

## Prices of Railway Stocks

THE current prices of railway stocks, like the prices of many other stocks, make the thoughtful observer wonder what are the influences that really determine stock market prices. It is often assumed that they are determined principally by current and prospective earnings and prevailing rates of interest. It would be impossible to show that these influences have determined the general trend of the prices of railway stocks during the last five years.

For some years the *Railway Age* has compiled and published weekly in its news section the latest available average prices of 20 representative railway stocks and bonds. On November 7, 1923, the average market price of these bonds was \$82.38, and on November 7, 1928, \$94.37. Meantime, the average price of the 20 representative railway stocks increased from \$60.05 to \$123.38, or more than 100 per cent. As statistics of net operating income are available for only the first 9 months of 1928, we shall give figures regarding the net return earned for only the first 9 months of each year. In the first 9 months of 1923 the return earned by the railways was at the annual rate of 4.64 per cent. In 1924 it was 4.21 per cent, but the average price of the stocks included in our computations had increased on November 7, 1924, to \$76.29. In the first 9 months of 1925 the return earned was at the rate of 4.77, and in November the average price of the stocks was \$88.59. In the first 9 months of 1926 the return earned was at the rate of 5.22, and in November the average price of the stocks was \$101.78. During most of the years mentioned the return being earned by the railways was increasing, the prevailing rate of interest was comparatively low and there seemed sufficient reasons for advances in their stocks.

The year 1926 was the most prosperous the railroads had had since the war. In consequence, in that year and in 1927 a good many railways increased their dividends. The year 1927 was, however, one of declining net return. The average rate earned in the first 9 months was 4.6 per cent. Furthermore, interest rates were increasing. Nevertheless, in November, 1927, the average price of our 20 representative railway stocks had increased to \$119.30—a greater increase within a year than had occurred in any of the preceding years mentioned. In the first 9 months of 1928 the railways had less traffic, both passenger and freight, than last year, and succeeded in increasing their net operating income by \$11,500,000 only by economies in operation. It was \$71,000,000 less than in the corresponding part of 1926, and the return earned was at the annual rate of only 4.55 per cent, or less than in any year since 1922, excepting 1924. Furthermore, the prevailing rate of interest in the stock market now had increased, and ranged not far from twice as high as five years before. Nevertheless, the average price of our 20 representative railway stocks reached \$127.55 in May. It subsequently declined sharply, and from June until recently railway stocks hardly participated in the bull movement on the stock exchange. On November 7, however, the average price of the stocks mentioned was, as already stated, \$123.38, and since then it has advanced. It is now not only more than double what it was five years ago, but is about 25 per cent higher than in the latter part of 1926, although the railways as a whole have not since approached the net operating income made in that year.

One explanation frequently given of the prevailing

high prices of stocks in general is that there are in prospect large increases of earnings and dividends in many industries. There are many railways that could have paid larger dividends from their net income within recent years, and there are not a few that could pay larger dividends even from their present net income, but it is certainly not true that the difference between railway conditions and prospects five years ago, or even two years ago, and now warrants the change that has occurred in the prices of their stocks. Either the prices are too high now or they were too low then.

The market quotations of stock prices have an effect on the railroad industry that they do not have on any other industry. Everybody seems to be glad to see other industries prosper and to see in advances in the prices of their securities evidence that they are prosperous. On the other hand, excessive advances in the prices of railway stocks are positively harmful to the railroad industry, because they are accepted by the public as indicative of the prosperity of the industry, and when the public thinks the railroad industry is highly prosperous there is usually an increased demand for the kind of regulation that keeps it from prospering.

The prospects of the railways are now better than they have been at any time within two years. It is to be hoped that wild speculation in their securities will not make the public believe that their present and prospective prosperity are much greater than they actually are, and, in consequence, tend to increase the pressure for regulation that would prevent the increases in their net operating income that they need.

## The Election and the Railways

FROM a railroad standpoint the national political campaigns of 1924 and 1928 presented a strong contrast. The attacks which had been made upon private ownership of railways for some years culminated in 1924, when the late Senator LaFollette, supported by railway labor leaders and many radical public men, ran for president upon a "progressive" platform which favored government ownership of railways. After the election in 1924 the *Railway Age* said in an editorial, "Never has the railroad question been so fully discussed in any national campaign." One of the most noteworthy features of the recent campaign was the comparative lack of discussion of the railroad question. It was incidentally mentioned in discussions of farm relief and inland waterway development, and here and there politicians indulged in outbreaks against the railways, but, on the whole, there was very little said about railway ownership, management, service or rates.

Unlike the result of the election four years ago, therefore, the result of the election in 1928 cannot be regarded as a definite expression of the attitude of the American public regarding railroad ownership, management or regulation. Nevertheless, in a broad way it may reasonably be construed as favorable to the principles of private ownership and fair and constructive regulation.

Both Mr. Hoover and Mr. Smith advocated extensive development of inland waterways. Railway officers and others having special knowledge of the economics of transportation believed that both went too far in this direction. As the campaign progressed, however, there appeared to develop certain differences between the candidates regarding principles of government which

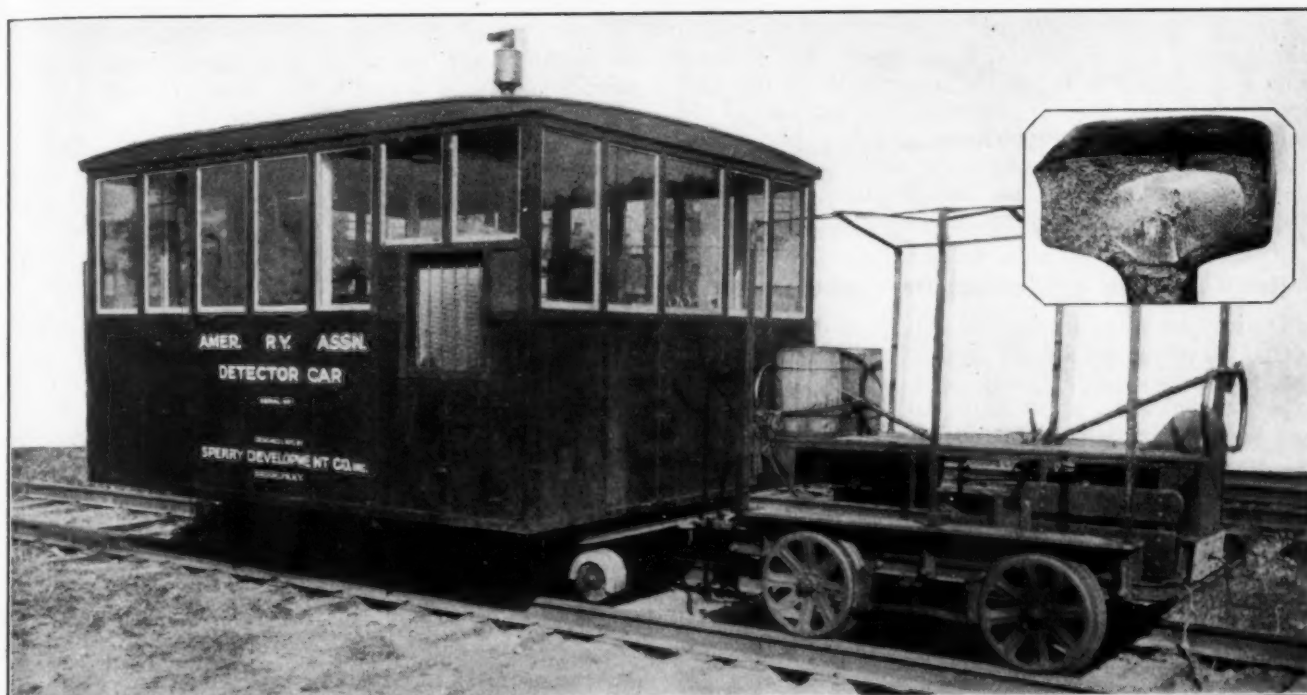
were important. Governor Smith strongly advocated government ownership of hydro-electric power sites and plants. This, together with other views expressed by him, led Mr. Hoover to make in New York an address in favor of private initiative and enterprise in business, and against state socialism, which was perhaps the most significant utterance of either candidate during the campaign. However much other issues may have effected the result, Mr. Hoover's overwhelming victory cannot be construed otherwise than as an endorsement by the public of his general views regarding the proper relations between government and business.

The relations between the government and the railroads are unique. The government, by its waterway and highway policies, is subsidizing competition with the railways, and even engaging in this competition itself. It is also subjecting the railways to a more restrictive policy of regulation than is applied to any other industry. The views expressed by Mr. Hoover on inland waterways indicate that he favors an increase of one form of this competition. He has also, in the past, advocated a policy of readjusting freight rates downward on basic commodities and upward on more valuable commodities, which probably contributed toward causing the passage of the Hoch-Smith resolution, although he would hardly have favored the actual provisions of that resolution.

Mr. Hoover's general views regarding the proper relations between government and business are sound. He strongly desires to promote the national economic well-being, and will undoubtedly consider facts and arguments bearing on policies affecting the railways as open-mindedly as he will facts and arguments bearing on policies affecting any other large industry. He has repeatedly made public statements showing that he fully recognizes the disastrous effects produced by the kind of regulation which arrested railroad development before the war, the greatness of the achievement of the railways in subsequently rehabilitating their service, and the enormous contribution this improvement in railway service has made to the general prosperity that has prevailed within recent years. He frankly expressed the opinion in one of his earliest speeches in the recent campaign that the railways could not stand a reduction of rates, and everything he has ever said upon the subject indicates that he believes the policy of regulation announced in the Transportation Act is sound and should be carried out.

While, therefore, the railroad question was not directly an issue in the recent political campaign, there is no reason why the railroads should not feel satisfied with its results. Congress plays a very important part in railway regulation. It passes the regulatory laws, and the Senate may accept or reject nominations to the Interstate Commerce Commission. But the president usually has a strong influence on legislation, and he has the initiative in determining the membership of the commission. Mr. Hoover is as strongly opposed to government ownership of railways as any other American public man. Realizing, as he does, the importance of railroad transportation in our economic life, he is bound to be influenced in his attitude toward legislation, and in making nominations to the Interstate Commerce Commission, by a desire to see followed a policy of railway regulation which will be conducive to the maintenance of private ownership and the success of private management. It seems reasonable to assume, therefore, that under his administration the influence of the presidential office will be exerted in favor of fair and constructive regulation.





The New A. R. A. Detector Car as Operated Over the N. Y. C. Pulled by a Heavy-Duty Motor Car

## Transverse Fissures Can Now Be Located

*Extended tests prove practicability of equipment for finding hidden defects in rails*

**A**FTER months of study, experiment and tests, the new Sperry transverse fissure detector car has been officially accepted by the American Railway Association and is now in actual service on certain lines in the East. This equipment not only searches out and records on a permanent paper record the location and relative size of all internal fractures in the heads of rails, but also marks the precise locations of such fractures directly on the rails themselves, by means of a paint spray.

### General Description

This equipment, which is operated and controlled entirely by electricity, forms a complete, self-contained unit, compactly arranged on the platform of a heavy-duty trailer car and entirely enclosed against the elements by a frame housing fitted with windows on all four sides. When in operation, the entire unit is pulled over the track by a motor car at a speed of about five miles per hour and, under the observation and direction of two operators, functions entirely automatically.

The fundamental principle utilized in the new detector equipment is based upon the fact that if the rail is made to act as an electrical conductor and is saturated with a very heavy current, all internal hidden flaws encountered, including occlusions, shattered zones, pipes and fissures, present obstructions in the path of the heavy current forced through the rail. This is true

even though the flaws are very small, and regardless of whether they are disposed horizontally, at an angle, or are truly transverse to the longitudinal axis of the rail. In other words, when the saturated current reaches any of these flaws or fissures, it cannot proceed in a straight line, and is, therefore, required to make an abrupt change in its direction in passing around the obstruction. In the new transverse fissure detector car, special apparatus has been developed, which is located in the region between the points where the heavy current enters the rail and leaves it, by means of which any deviation or abrupt change of direction of the current within the rail is detected immediately.

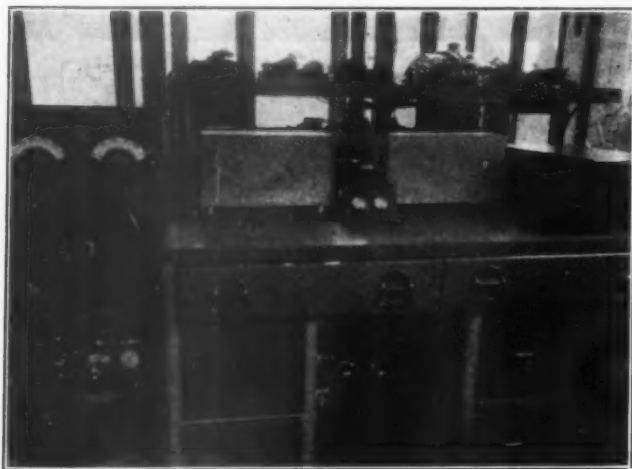
The principal units of the detector equipment for locating defects in rails consist of a gasoline engine-generator set, rail contact brushes carrying the energizing current to the rail, and a special device which passes along the top of the rail head, for detecting and measuring the abrupt current changes referred to above. As these changes in the direction of the current produce only a very feeble manifestation, this is carried to amplifiers, similar to those used in radio reception, which build it up to a point where it can be utilized for operating relays. The relays, in turn, control electric circuits of larger capacity, which operate all of the recording instruments.

The principal recording instrument of the detector equipment consists of a series of seven electrically-controlled recording pens which operate on a table, over

which moves a continuous strip of paper. Six of these pens are transverse fissure indicators—three for each line of rails, the seventh indicating the location of the joints in the track. Supplementing this paper record, a paint gun on each side of the car automatically sprays a spot of paint on the track rail, precisely at the point where the detector equipment indicates a defect of some character.

#### Early Detector Equipment Developed Defects

During the 15 years immediately preceding the successful development of the present A. R. A. detector car, three principal methods, or principles, have been experimented with in an effort to develop a satisfactory device for detecting transverse fissures. These



A View from the Rear of the Car Showing the Relay and Amplifier Table, Paint Spray and Meter Panel

were a mirror mounted on a special frame for movement along the rail, whereby visual inspection could be made of the under side of the rail head; the magnetic principle, wherein the rail was magnetized, and flux leakage, due to irregularities in the material, was detected by search coils; and the measurement of the resistance effect of discontinuities in the rail head by energizing the rail and then detecting the minute difference in potential resulting at transverse fissures. All of these methods, including the last, which was the principal upon which the Sperry detector equipment was first based, have been discarded. The mirror method was both slow and laborious and had the further serious objection that the detection of failures was impossible until the development had reached the contour of the rail section, at which time the rail was practically ready to break. The magnetic apparatus proved highly sensitive and was discontinued as impractical because it produced results from which it was impossible to differentiate between transverse fissures and such other head irregularities as result from the slipping of drivers, gagging and cold bending of the rails, accidental spike maul blows on the rail, the cold rolling effect of wheels, segregation, laminations, etc.

After having given highly satisfactory results in extended laboratory experiments, the Sperry method of measuring the difference in potential caused by the presence of fissures in rails was also discarded soon after experiments were made under actual track conditions, in spite of the fact that the greatest optimism was felt for its success. On the whole, the equipment was found to be fundamentally correct and properly arranged, and the impractical factor was due, not to

the method itself, but to the fact that the rails in track were found to be coated with a superimposed layer of hammered-in enamel, usually consisting of insulating ferro-ferric oxide some thousandths of an inch in thickness. The thickness of this layer of enamel seems to be in proportion to the density of traffic and, in some instances, where this layer is heavy, all of the cold forging of the rail by wheel action, to which the deformation of the rail is due, apparently goes on through the layer.

In an attempt to overcome the difficulty presented by this layer of insulating material, several types of cleaning brushes were experimented with, but in each instance with unsatisfactory results. The only method found by which it was possible to get down through this layer to the actual surface of the steel rail itself was through grinding. This process was effective but was found to be altogether too slow to be practical, and therefore, new research had to be instituted to overcome this serious difficulty. The seriousness of this difficulty was added to by the presence of rust, dirt, mill scale, and other irregularities commonly found on the surface of rail heads.

After several months of experimenting with this method of detection on a special test section of track on the New York Central, in which a considerable number of rails known to have transverse fissures were laid, and also on the main line, the entire method then used to detect fissures was changed to the new method now employed. As a result, the present transverse fissure detector equipment differs in many respects from the equipment under test early in the year and described briefly in the March 9 issue of the *Railway Age*.

#### Description of Electrical Equipment and Circuits

The present equipment, which consists essentially of a gasoline engine-generator set, rail contact brushes, a pick-up device, amplifying tubes, a number of relays, a recording table with electrically-operated pens, a paint gun unit for marking the location of fissures, and rail cleaning brushes, is mounted on a standard steel-frame Kalamazoo trailer car equipped with four-wheel hand-operated brakes. Above the platform this car is enclosed in a special frame housing, the upper half of which is fitted with drop sash windows on all four sides. The car is equipped with a drawbar and, when in actual operation, is pulled over the track at the rate of about five miles per hour. Motive power for pulling the detector equipment on the New York Central was furnished by a Casey Jones motor car equipped with a Ford engine. On other lines, however, it is planned to pull the car by such suitable power as the roads can provide.

The power plant of the detector equipment is an engine-generator set consisting of a separately excited d.c. generator with a rating of 4,000 amperes at 2 volts, operating at 900 r.p.m., which is direct-connected to a 25-hp. water-cooled Waukesha gas engine. The exciter unit, which is a d.c. generator capable of developing 110 volts at 10 amperes, is belt-connected to the main drive shaft of the gas engine. This equipment is compactly arranged across the forward end of the car platform.

From the generator, the current developed is carried through heavy copper conductors to buss bars on each side of the car, which, in turn, are connected by separate conductors to each of the rail contact brushes. In all, there are 32 such brushes, assembled in four groups of eight brushes each, two such groups being located in line with each other on each rail and spaced



about three feet apart. In each of these contact assemblies the brushes are arranged in four sets of two each, located directly behind each other, and are held in a rigid, brass, brush carriage. The brushes themselves are solid copper bars and have a mitered rail contact face so as to present a maximum contact surface to the rail. This is the main point of difference between the present type of brushes on the car and those used during the early experiments, the old type brushes having consisted of layers of wire gauze, compacted into more or less flexible bars. As was the case with the old brushes, the new type brushes are pressed against the head of the rail by heavy springs, forming a part of the brush carriages. The new type of brushes have been found better adapted to the service demanded and, being rigidly pressed against the rail, effect sufficient contact with the steel through the surface coating of insulating ferro-ferric oxide to transmit the current.

The weight of each brush assembly, when lowered to the rail, is carried by two flanged wheels, one at each end of the brush carriage. In addition, these wheels, which are held tightly against the gage side of the rails by springs, insure the accurate integrity of location of the whole electric system with respect to the rail.

Both brush carriages on each side of the car are hung from a suitable side beam and are raised and lowered simultaneously by the operation of a hand lever inside the car. When in the lowered position, the brush carriages are independent electrically and practically independent mechanically from the car frame, the only mechanical connection being that sufficient to hold the carriages properly in a vertical position and to move them along the rail. When in a raised position, the carriages are held rigidly against the frame of the car.

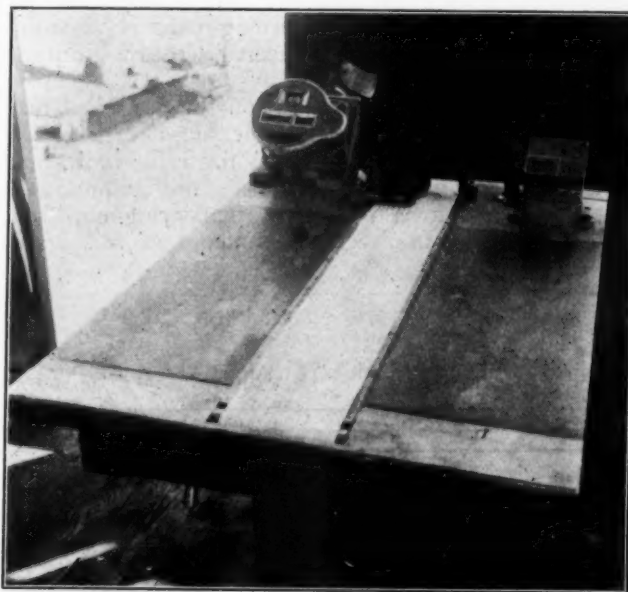
#### How Defects Are Detected

With this arrangement of brushes connecting the generator and the rails, the rail sections between the brushes on each side are energized and form parts of closed electrical circuits. When so energized, the path of the electrical flux through a section of perfect rail is constant. When a transverse fissure or other flaw is encountered, however, there is an immediate change or distortion of the direction of the current flux in the rail in passing around the obstruction, the severity of which indicates the relative size of the fissure or other flaw encountered.

Through specially designed apparatus mounted on each side of the car, all of these abrupt changes in the

direction of current flow in the rail are detected. In addition, this apparatus interprets in terms of magnitude the changes in the current direction above referred to, and produces slight energizations which pass through electric circuits to amplifiers housed on a table in the center of the car. These amplifiers are of the ordinary heterodyne type, and step up the induced voltage approximately 25,000 times.

From the amplifiers, the amplified energizations pass to a group of 12 special relays, suitably arranged on a platform over the top of the table referred to, and connected in circuit with the recording pens and air valves on the paint-spraying equipment. The relay circuit for operating the recording pens carries six volts secured from the starting storage battery of the gas engine,



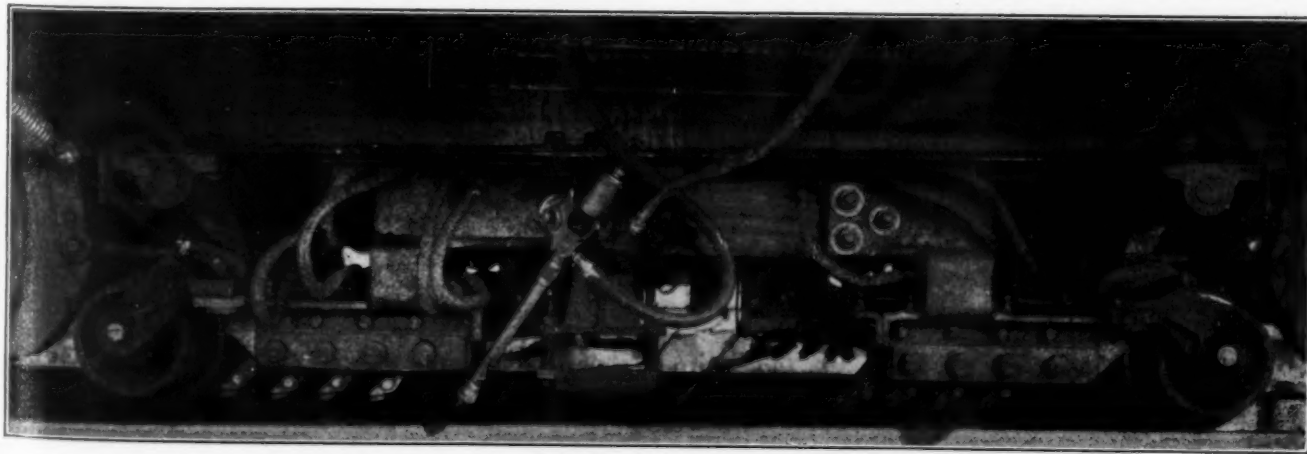
The Recording Table, Showing Its Seven Pen Instrument, and the Speedometer and Joint Counter

while the relay circuit for the operation of the paint spray air valves carries from 80 to 110 volts, secured directly from the generator exciter.

#### Recording Device Indicates

##### Location and Size of Fissures

The recording device for producing a graphical record of conditions found in the rail is substantially the same as used early in the year, this consisting of a recording table, on top of which travels a friction-driven



One Pair of the Brush Carriages in the Raised Position, Showing Contact Brushes, Paint Gun and Pick-Up Device

strip of paper from a roll supply, which moves over the table at the rate of 1/16 in. per foot of track covered by the car. Directly in contact with the paper are seven pens which are actuated as the pen relays are affected by changes in the energy received from the amplifiers.

Fissures located in the two track rails are indicated on the paper by six of the pens, a group of three pens indicating the fissures in each rail. The seventh pen, which is located between the groups of fissure-indicating pens, records the location of joints. In recording the detection of a fissure, the relays are so adjusted that a short transverse line is drawn by one pen if the internal break is of intermediate size; and all three pens operate if the break is of large area. These three degrees of grading indicate roughly failures of 7, 15 and 25 per cent of the railhead area. Visual check on the proper functioning of the recording pens is afforded through suitable indicators connected across the output of each of the amplifiers.

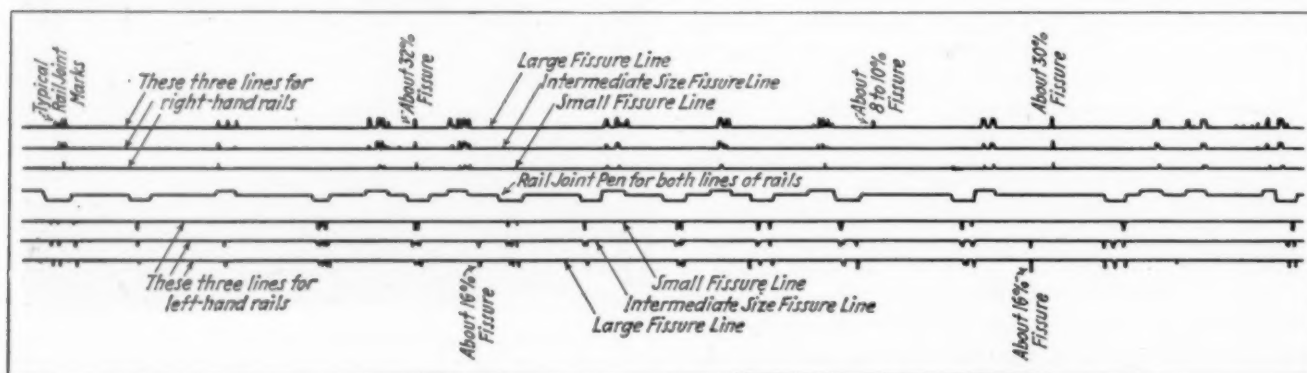
Thus seven lines are produced on the graphical record—the three lines on the left indicating defects in the left-hand rails; the three lines on the right indicating defects in the right-hand rails, and the middle line indicating the position of joints. A numbering machine, which records consecutively the number of rail joints

circuit of the generator current; a metal storage battery box, and a pair of rotary wire brushes for cleaning the surface of the head of the rail in advance of the contact brushes. These cleaning brushes, one of which is mounted directly over each rail at the head end of the car, are made of steel wire and are about 10 in. in diameter. Both brushes are belt-driven from the engine-generator shaft and operate at a speed of about 2500 r.p.m.

#### First Service Run Made on N. Y. C.

At the present time, the detector car is being operated over main line track, under train order, by two men, in addition to the motor car operator in charge of the tow car, and a conductor and a flagman. No provision is made for setting the car off from the track, it being necessary for it to clear trains at passing tracks or other sidings.

In its first actual service run, which was completed only recently, the car was operated over the two main tracks of the New York Central between Beacon and Rensselaer, N. Y., a total distance of 166 miles. Within this territory approximately 53,000 rails were covered, which have been in the track an average of about 5½ years. In all of this distance, defect indications



A Section of the Record Made by the Detector in Passing Over a Section of the Special Test Track

passed over on one side of the track, makes it possible to number all rails on the record which show the presence of transverse fissures.

In addition to the graphical record produced by the pens, an actual indication of the location of fissures is produced directly on the track rails through the paint spray unit which forms a part of the detector car equipment. This unit, which was furnished by the DeVilbiss Company, includes a spray gun mounted on each side of the car and directed toward the web and base of the rails. Air for the operation of the guns is furnished by a small air compressor, which is mounted under the forward end of the car and driven through a belt connection with the shaft of the motor-generator set.

Operation of the paint spray gun on each side of the car is, in each case, through the opening and closing of a magnetic air valve located below the floor of the car and actuated by one of the paint relays. Ordinarily the gap between the rails at each joint would cause the paint spray equipment to operate, but this has been precluded through special devices which prevent the operation of the paint spray without affecting the operation of the pens.

Auxiliary equipment used on the detector car includes a speedometer mounted on the recording table, in order to keep a check on the speed at which the car is being operated; a switch and meter panel connected in the

were recorded on only 0.06 of 1 per cent of the rails, these varying from a few indications of relatively strong intensity to a greater number of indications of moderate or weak intensity.

Further details of the record established by the car on the New York Central are not available at this time, as a complete analysis has not yet been made of the results of the initial run, or of the record of a check run over a portion of the territory originally covered. On the initial run the car covered an average of from 18 to 38 miles per day, depending upon the conditions encountered, while on the check run, in which record was made over portions of the track only, the car averaged about 40 miles per day.

#### Many Assisted in Developing Detector Car

The experimental and development work which has resulted in the present transverse fissure detector equipment was begun about five years ago when E. A. Sperry of the Sperry Development Company, Brooklyn, conceived the idea of utilizing the air-gap resistance effect of disassociated particles or areas in the interior or rail heads to disclose their identity. Mr. Sperry outlined his plan to the Rail committee of the American Railway Engineering Association, and, after a careful investigation, an initial appropriation was made by the association for a co-operative experimental study of the



proposed plan in the laboratory of the Sperry Development Company. As a result laboratory equipment was designed and assembled which, under test, became so proficient that the size and location of each internal transverse fracture or fault in the rail head could be ascertained with a large degree of accuracy. Following these tests, an agreement was reached between the Sperry Company and the American Railway Association, in August, 1927, for the construction of a track car for the detection and marking of the internal failures of rails in the track. This car was completed early this year and was put under test on a special test track in the yard of the New York Central at Beacon, N. Y., in which were laid sections of rails in which transverse fissures had developed in service. While the results of the first actual service tests were highly encouraging, it was these results and the results of subsequent tests made on the high speed main line tracks of the New York Central, which led to the final change in the method of detecting the location of fissures.

From the above, it is evident that credit for the successful development of the present equipment for detecting and indicating the location of transverse fissures in rails in the track is due to a number of individuals and organizations; to E. A. Sperry and the Sperry Development Company; to the American Railway Engineering Association and the American Railway Association, and to the New York Central which has extended every assistance to further the successful completion of the car. Directly representing the Sperry

gineer maintenance of way. The operation of the car is under the general direction of the Rail committee of the American Railway Engineering Association, with direct supervision by W. C. Barnes, engineer of tests for the committee. The operator of the car is Henry W. Keevil.

At the acceptance test of the detector car, which took place at Beacon on October 2, nine of the different roads having membership on the Rail committee of the A. R. E. A. had representatives present. While definite future plans for the operation of the A. R. A. equipment have not been formulated, under the present plan of operation, it is being assigned for a test period of six days to each of a number of roads in the East



The New Detector Car Outfit of the Sperry Rail Service Company

and South. Within this period each road has full jurisdiction over the actual operation of the car, using it on such lines as it may select.

#### Second Car Developed for Commercial Work

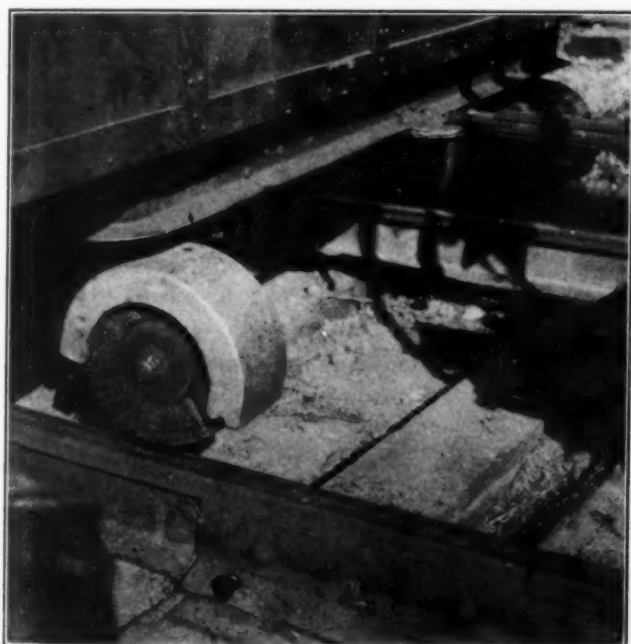
In view of the demand being made for the service of the newly developed transverse fissure detector equipment and the desire of several of the roads to have their lines serviced by this equipment in the hands of experts, rather than to purchase one of these cars at this time and operate it themselves, the Sperry Development Company has rushed through a second car, which has been shipped to Chicago and is already operating on certain western lines.

Profiting by the experience gained in building the first car, the second car incorporates several additional features which are expected to facilitate the duties of the operator and produce a more valuable and effective record of the conditions found in the field. In the main, the electrical equipment and the principles involved are essentially the same as those embodied in the A. R. A. car.

#### Changes in Equipment Arrangement

One of the principal changes in the newer car is found in the arrangement of the equipment within the car. In this arrangement, the newer car has a working space transversely across the center, and the space across the rear end is occupied by the amplifier and relay table, the meters, and the recording instrument table. So arranged, the operator can sit facing the rear of the car, watch his equipment, and at the same time have a clear view of both lines of rails behind him.

Another change incorporated in the newer equipment is in the recording instrument, where two additional pens have been provided. One of these pens is an additional joint indicating pen, so that there are two



Rotary Wire Brushes Clean the Rail Head in Advance of the Contact Brushes

Company during the development of the detector equipment has been H. C. Drake, assisted by J. A. Drain, Jr., while the American Railway Engineering Association has been represented by Earl Stimson, chief engineer maintenance of way of the Baltimore & Ohio, and chairman of the Committee on Rail; W. C. Barnes, engineer of tests for the Rail committee, and by C. B. Bronson, assistant inspecting engineer of the New York Central, and a sub-committee chairman of the Committee on Rail. The assistance given by the New York Central, and all operations of the car on that road, have been under the direction of J. V. Neubert, chief en-

joint pens in the new instrument, one for each line of rails and the other is called a landmark pen. This latter pen ordinarily produces a continuous straight line, parallel with the other pen lines, but a jog can be produced in it when desired by closing a contact switch provided in the motor car which pulls the detector car. Thus, as the outfit moves over the track, the tow car operator, by closing the landmark pen contact switch beside him, can indicate directly on the record the precise locations of mile posts, bridges, signals, highway crossings, telegraph poles, etc. As he closes this switch to produce a landmark indication on the record, he advises the detector car operator of the specific object passed, over a telephone, so that the detector car operator can make a proper notation on the record opposite the indication made. In the telephone arrangement provided, transmission is one way only, and no provision is made for the detector car operator to talk with the tow car operator. In lieu of this, however, a buzzer circuit connects the two cars so that through a simple code, the detector car operator can transmit operating instructions to the tow car operator.

#### Brush Lifter a Feature

Another feature included in the new commercial car, primarily as a precautionary measure against damage to the electrical contact brushes, is an air-operated brush lifter, which raises or lowers the two brush carriages on the car separately. This is operated by the tow car operator who raises the carriages each time the car is stopped. In order to preclude the possibility of a reverse movement of the car with the brushes in the lowered position, which in all probability would damage them at uneven rail joints, the brush-lifting device is arranged to work automatically, raising both brush carriages, with the slightest movement of the car in the reverse direction.

#### Special Tow Car Is Provided

In order to adapt the commercial equipment to operation over heavy grades, and in inclement weather, the tow car provided for use with the detector car is a specially enclosed and equipped motor car. This car, which is a heavy-duty Kalamazoo inspection car with a 35-hp. engine, is enclosed in a manner similar to the detector car, with glass panels on all four sides to give the operator a clear view in all directions.

As the operators of the detector car and tow car will, of necessity, be confined rather closely to the equipment both day and night while out on the road, the tow car is suitably fitted to afford them conveniences and sleeping facilities. In the arrangement provided there is a small toilet room, a wash stand, fed from a large overhead water container, one permanently fixed bunk, and one movable bunk which is raised to the ceiling of the car during the day. In addition, the car is equipped with electric lights and is fitted with a comfortable wicker chair and a small table. The new detector car outfit just described, is being operated by the Sperry Rail Service Company, Chicago, a new company organized to give this service to the railways.

KANSAS, during a two-year period ending June 30 last, has eliminated 119 grade crossings by the relocation of highways or by building viaducts. Of these, 63 were eliminated in the year ending June 30, 1927, when 57 highways were relocated so as not to cross railroads and six grade separations were made. In the following 12 months, 56 crossings were removed by rerouting 53 highways and by three grade separations.

## Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading totaled 1,103,342 cars during the week ended November 3, smaller loading of all commodities except coke contributing to the decline of 58,634 cars from the total in the preceding week. The total loading represented an increase of 64,267 cars as compared with revenue freight loaded in the corresponding week of last year, which was shared by all commodities with the exception of live stock and less-than-carload merchandise. The week's total showed a decrease of 28,490 cars as compared with loading in the corresponding week of 1926, loading of grain and miscellaneous freight only reaching larger totals than two years ago. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

#### Revenue Freight Car Loading

Districts	Week Ended Saturday, November 3, 1928.		
	1928	1927	1926
Eastern .....	246,511	228,572	250,979
Allegheny .....	223,538	202,444	230,995
Pocahontas .....	63,436	52,283	60,800
Southern .....	160,405	156,938	164,480
Northwestern .....	159,047	148,815	162,216
Central Western .....	161,856	163,069	172,728
Southwestern .....	88,549	86,954	89,634
Total Western Districts.....	409,452	398,838	424,578
Total All Roads.....	1,103,342	1,039,075	1,131,832
Commodities			
Grain and Grain Products.....	52,652	48,207	48,549
Live Stock .....	33,944	35,079	37,074
Coal .....	196,350	166,329	227,407
Coke .....	10,855	8,809	12,927
Forest Products .....	66,494	66,159	69,557
Ore .....	48,243	34,244	48,358
Merchandise L. C. L.....	267,134	270,028	268,485
Miscellaneous .....	427,670	410,220	419,475
November 3, 1928 .....	1,103,342	1,039,075	1,131,832
October 27 .....	1,161,976	1,112,816	1,208,878
October 20 .....	1,162,095	1,129,055	1,200,941
October 13 .....	1,190,127	1,120,007	1,202,780
October 6 .....	1,186,598	1,102,994	1,174,928
Cumulative total, 44 weeks.....	44,021,267	44,676,701	45,491,988

The freight car surplus averaged 105,017 cars during the period ended October 31, as compared with 93,204 cars on October 23. The total included 54,263 box cars, 21,128 coal cars, 16,939 stock cars and 4,595 refrigerator cars.

#### Car Loading in Canada

Total revenue car loadings at stations in Canada for the week ended November 3 were 95,242 cars, a decline from the previous week of 2,535 cars, but an increase of 9,979 cars over the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
November 3, 1928.....	95,242	42,347
October 27, 1928.....	97,777	43,074
October 20, 1928.....	93,081	42,295
November 3, 1927.....	85,263	36,028
Cumulative Totals for Canada		
November 3, 1928.....	3,097,674	1,741,244
November 3, 1927.....	2,836,712	1,654,987
November 6, 1926.....	2,725,792	1,648,900

A PASSENGER COACH, covered with strips of fabric, which take the place of the paint and varnish, has been recently put into trial service by the Southern Railway of England according to reports to the Department of Commerce. The chief advantage of this material is said to be the speed with which a coach can be covered, as compared with the time which it takes to prepare paint and varnish in the ordinary way. The material is of the standard shade of green used for outside painting of rolling stock of the Southern and was of their usual standard, which is supplied to the motor car industry in large quantities. It is stated that it is a little early yet to give any report on the wearing qualities of the material, but so far as their experience goes up to the present it is retaining its color well, and is moreover very easily cleaned with soap and water.





A Record Movement Was Handled Through Argentine, Kan., Yard This Year

## Sante Fe Speeds Up Wheat Movement

*Triple-crewing and other modern operating methods aid in transporting grain crop*

THE rapid growth of the use of combines and tractors in the harvesting of wheat in the territory served by the Santa Fe, has created new operating problems for that railway and others in that area to solve. The new harvesting method results in a greatly accelerated movement of the grain to market, as compared with the binder method of harvesting, when the grain remained on the field in shocks or in stacks for some time, and its movement was spread over a longer period. Despite the radical change in loading conditions, however, the Santa Fe, by improved operating methods, particularly in yards, was able to handle 58,212 cars of grain in the three months ending September 21, 1928, an average of 19,404 cars per month, without a single complaint regarding the supply of empty cars or the movement after loading.

### Movement Concentrated in Peaks

That the present harvesting methods result in concentrated peak movements is indicated by the figures for the first three weeks in July of this year. During the week ending July 7, a total of 7,362 cars of grain were loaded on the Santa Fe, an average of 1,052 per day. During the following week the high mark was reached, with 11,022 cars loaded, an average of 1,575 cars per day, while 9,692 cars were loaded during the week of July 21, or 1,385 cars per day. The peak movement for one day was on July 7, when 1,885 cars of grain were loaded on the Santa Fe. In addition to this local loading, some grain is received from connections,

principally small feeder lines, to which the Santa Fe supplies the empty cars for loading. Complete figures on the movement, including both cars loaded locally and received from connections, are shown in Table 1.

The Kansas state agricultural department estimates that in the western third of that state, practically 100 per cent of the wheat is harvested by the combine and

Table 1. Santa Fe Grain Loadings, 1928.

Week Ending	Cars Handled
June 22 .....	1,023
June 29 .....	1,728
July 6 .....	6,101
July 13 .....	11,601
July 20 .....	10,537
July 27 .....	6,698
August 3 .....	5,115
August 10 .....	3,021
August 17 .....	2,938
August 24 .....	2,073
August 31 .....	2,109
September 7 .....	1,710
September 14 .....	1,754
September 21 .....	1,799
Total .....	58,212

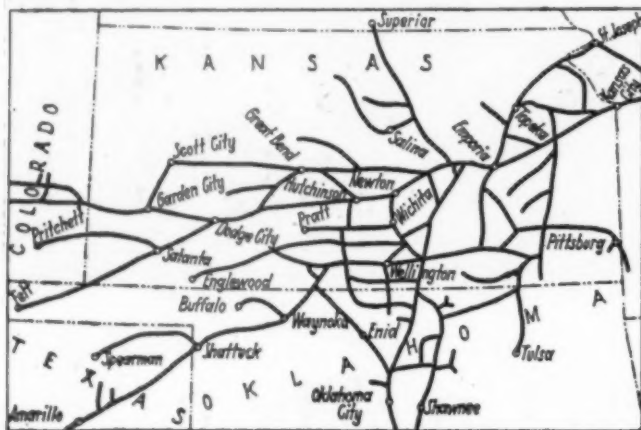
tractor method, as compared with 50 per cent in the central portion and 30 per cent in the eastern third of the state. The extent to which this new method increased in the past year is indicated by the fact that, prior to the harvesting season, the Santa Fe moved 1,012 cars of combines and tractors into the Kansas wheat producing territory west of Hutchinson. The peak movement thus produced is illustrated by the fact that 14,662 cars of grain were loaded on the Santa Fe in western Kansas during July and August, of which 10,-

438 cars were loaded in July. The manner in which the movement rapidly approaches its peak is shown in the following statement of the loadings in western Kansas during the first two weeks of July:

Date	Cars Loaded	Date	Cars Loaded
July 1.....	1	July 8.....	193
July 2.....	9	July 9.....	419
July 3.....	41	July 10.....	448
July 4.....	97	July 11.....	509
July 5.....	186	July 12.....	557
July 6.....	291	July 13.....	508
July 7.....	368	July 14.....	601

#### Development of Grain Territory

The Santa Fe has played an important part in the development of the wheat territory of Kansas, Oklahoma and the northern portion of the Panhandle of Texas. From its inception it has endeavored to meet the needs of the farmers in the way of railway facilities.



The Santa Fe Has Numerous Branches in the Wheat-Growing Territory

Practically all of the branches and secondary main lines in this territory were built to serve existing agricultural developments or promote new ones. A considerable branch line mileage has been built in the past few years in pursuance of this policy.

At the present time, the Santa Fe mileage in the wheat-producing territory of Kansas alone is 3,064 route miles. The Oklahoma wheat territory which lies north of Oklahoma City and Shawnee, is served by 765 route miles of Santa Fe lines, while the Texas Panhandle, north of Amarillo, is served by 238 route miles.

Variable weather from season to season and the changing market conditions make an accurate comparison of the growth of the wheat territory served by the Santa Fe impossible; however, there is no doubt that this road has been instrumental in promoting its prosperity.

#### Handling of Empty Cars

The development of sudden peak movements has had the effect of increasing the problems of car supply. To meet the accelerated demand, the Santa Fe has developed a system of advance preparation. Throughout the growing season, operating and agricultural department representatives keep in close touch with the situation, so that, when the harvesting begins, an estimate of the approximate necessary car supply is available.

Empty cars are then distributed to the loading territory and congregated at strategic points. After this requirement has been taken care of, "pools" of empty cars are established at Chicago, Fort Madison, Iowa, Argentine, Kan., and Emporia. These cars are sent to the loading territory before the initial supply is exhausted. To meet the sudden rush, they are run to concentration points as solid red-ball trains, with the

same or faster schedules than manifest trains, depending upon the urgency of the need. During the season, the yards are crowded with loaded cars, and the blocking of the empties into solid symbol trains permits them to be "main-tracked" through the busy yards without interfering with the loaded movement or increasing the complications of peak yard operation.

As a further precaution against congestion in the loading districts, all empty cars are given a rigid inspection before being permitted to leave the pooling points. Except in rare instances, this insures their fitness for loading upon arrival in the field. It has the dual advantage of relieving the car forces in the busy loading territory and preventing tie-ups because of bad-order during the loaded movement.

In the principal loading territory, west of Hutchinson, 6,000 system empty box cars suitable for wheat loading were on hand when the movement began. During the shipping season this was supplemented by 3,390 foreign empties, borrowed for the wheat shipments.

This special effort in the handling of empty cars enabled the crop to be transported without a single complaint as to car shortage. The empty cars were returned to the loading territory as rapidly as possible after they were unloaded at the various elevators, or returned from connecting lines. The extent of this return empty movement is indicated in the following statement of empties returned to the loading territory west of Hutchinson during the peak empty movement:

Date	Cars	Date	Cars
July 11.....	538	July 19.....	832
July 12.....	698	July 20.....	960
July 13.....	745	July 21.....	854
July 14.....	783	July 22.....	1111
July 15.....	676	July 23.....	1025
July 16.....	903	July 24.....	987
July 17.....	801	July 25.....	1073
July 18.....	1130	July 26.....	633

The relief obtained by maintracking these cars through yards is evident when the volume of the movement is considered.

The car supply was further augmented this year by the purchase of 2,500 new box cars of 100,000 lb. capacity, which were delivered to the Santa Fe just prior to the opening of the season and distributed in the loading fields. The effect of this is apparent when it is considered that the load limit of the new cars is 2,000 bushels, as compared with an average load limit of less than 1,400 bushels on all cars used during the 1927 season.

#### Loading Field Operations

Switching locals are run to set out empties and pick up loads at the country elevators in the producing territory. Formerly, it was only necessary to provide daily service to each elevator. All of the sidings serving the country elevators were, of course, built on the basis of the flow of business produced by the binder method of harvesting. However, the increased concentration of the movement brought about by the combine and the tractor method rendered many of these tracks inadequate during the peak in the heavy loading districts. To counteract this, service is rendered twice daily in the congested districts and the mileage of the runs of the switching locals has been reduced to 40 or 50 miles.

This and the peak movement requires additional power and more train and engine service employees. For example, 25 road engines and 5 switching engines were transferred to the Kansas territory west of Hutchinson this year. These locomotives were obtained from other portions of the system, where the peak traffic does not coincide with the wheat movement. This transfer of engines is rendered considerably simpler by the fact



that all of the branch lines in this territory are substantially built, being laid with 85 and 90-lb. rail, with but one exception. All bridges have a sufficient capacity, so that any engine used elsewhere on the system may be safely used on any but one of these wheat-loading branches. The types of locomotives used in this service are the Santa Fe, with a maximum weight on drivers of 320,000 lb., the Mikado, with a maximum weight on drivers of 268,200 lb., and the Prairie, with a maximum weight on drivers of 194,000 lb. Since the physical conditions permit the use of the heavier types of power, longer trains can be handled and the operation is materially simplified.

The necessary additional men are recruited almost entirely from other divisions of the Santa Fe and from local farmer boys along the line, many of whom return each season. The number of extra men needed is not large. On the western district, for example, 58 switchmen, 78 brakemen and 93 firemen were hired to handle the peak movement.

#### The Road Haul

The loaded cars are brought from the fields to district or divisional concentration points where they are made up into solid trains. The wheat is all consigned to grain dealers at certain marketing and inspection points, where it is given the protein test by state inspectors. After its quality has been determined, diversion orders are issued and the cars move to their final destinations.

The road-haul movement is materially aided by the heavy power available. Long engine runs permit a wider distribution of this heavy power. In the wheat territory, the Santa Fe runs its freight engines through as follows:

Between	Distance
Kansas City and Newton, Kan.	185 miles
Kansas City and Wellington, Kan.	261 miles
Kansas City and Purcell, Okla.	438 miles
Kansas City and Shawnee, Okla.	422 miles

The fact that the power used west of Kansas City is all of the oil-burning type also increased locomotive utilization during the peak period, since the time is saved at the terminals that would be necessary for "knocking" and building fires.

#### Yard Operations

The concentration of the peak movement has, of course, placed a heavy burden on the yards. This problem is particularly acute since no classification is possible until after the cars have been graded and reconsigned, which process takes considerable time. At Hutchinson, Kan., for example, where much wheat is reconsigned, the average detention time for grading and reconsigning was 48 hr. per car throughout the season. When the final disposition of a car is given to the railway, the individual car must be found and switched out singly. This process must be followed on each car until a train is built up and ready to move. To take care of this situation, a new flat yard was built at Hutchinson in 1926.

A particularly heavy burden is placed upon the yards at Kansas City and at Wichita, the principal storage elevator points. The capacity of the elevators on the Santa Fe at Kansas City is 6,000,000 bushels and at Wichita 2,468,000 bu. On June 28, the Kansas City elevators had 185,926 bu. in storage, and on September 5, they had 5,636,840 bu. At Wichita, 24,800 bushels were in storage on June 28 and 2,142,700 bu. on September 5.

This concentration of wheat together with a large volume of other traffic, combined to break all records for cars handled at Argentine yard near Kansas City and

at the Wichita yard. On July 21, at Argentine, 6,147 cars were handled in road haul and 2,038 cars in interchange, a total of 8,185 cars. On July 20, 5,448 cars were handled in road haul, and 2,466 in interchange, a total of 7,914 cars. The highest previous record was established on July 16, 1926, when 5,585 cars were handled in road haul and 2,016 in interchange, a total of 7,601 cars.

At Wichita, 1,249 cars were handled on July 10, and 1,676 on July 18, this year, as compared with the previous high record of 1,047 cars, established on July 25, 1926.

#### Triple-Crewing

The summary given in Table 2 shows the wheat movement through Argentine yard during the peak period. It also shows the peak day's business in all the terminals of the eastern lines.

As can readily be appreciated, wheat business of this magnitude, superimposed upon the regular traffic, would

Table 2. Wheat Movement Through Terminals

Date	Argentine Yard				
	Cars of Grain in Yard	On Hand for Disp'n.	Disposed of Past 24 hr.	Rec'd. Past 24 hr.	Total Rec'd. Since June 1
July 10	969	917	525	416	2,389
July 11	791	748	529	360	2,749
July 12	753	700	491	443	3,192
July 13	753	717	430	447	3,639
July 14	942	886	393	562	4,201
July 16	1,334	1,204	525	853	5,054
July 17	1,113	1,026	826	648	5,702
July 18	985	885	470	329	6,031
July 19	949	811	516	442	6,473
July 20	1,179	1,053	428	670	7,143
July 21	1,243	1,103	572	622	7,765
July 23	2,148	1,883	618	1,398	9,163
July 24	1,546	1,242	1,139	498	9,661
July 25	1,499	1,047	713	518	10,179

Terminal	Peak Day, July 23				
	No. Cars Grain in Yard	On Hand for Disp'n.	Disposed of Past 48 hr.	Rec'd. Past 48 hr.	
Chicago	52	52	111	127	
St. Joseph	95	95	58	138	
Kansas City	2,148	1,883	618	1,398	
Wichita	522	521	175	380	
Salina	28	21	29	10	
Enid	132	132	53	91	
Oklahoma City	22	13	5	9	
Total	2,999	2,717	1,049	2,153	

normally cause a shortage of switching locomotives. However, at all yards where more than two tricks are worked, the Santa Fe practices the triple-crewing of switching locomotives all year round. The plan is to work certain engines 24 hours a day for from 20 to 28 days continuously. During the periods of normal business, this results in a saving in fuel and engine-house expense. During the peak periods it is even more valuable, since it permits one engine to do the work normally done by two or three and greatly increases the capacity of the heavier switching power, as measured by average miles per car per switching engine-hour.

A study of the triple-crewing during the peak movement at Argentine, the largest yard, develops interesting facts. As far as possible, the locomotives in this yard are worked three tricks daily, some being worked only two tricks and others only one, depending upon the size of the locomotive and the class of work to which it is assigned.

The efficiency with which this triple-crewing was done is indicated by the fact that, from July 16 to July 22 inclusive, 543 yard engine tricks, an average of 77.5 tricks per day, were worked, with an average daily assignment of only 39 locomotives. During this period, an average of 12.1 locomotives worked three tricks daily, an average of 17.9 worked two tricks daily, while an average of 5 locomotives worked only one trick daily. An analysis of the triple-crewing operations is given in Table 3.

The success attending the triple-crew operation of

switching locomotives during the peak wheat movement brings out additional factors of economy obtainable by this method. The Santa Fe and other lines, as described in these columns from time to time, have been successful, during periods of normal business, in reducing fuel

Table 3. Triple-Crewing Analysis

Argentine Yard, July 16-22

Date	Engines Assigned	Tricks Worked	3 tricks	Engines worked 2 tricks	1 trick
July 16	38	71	10	17	7
July 17	38	78	12	20	2
July 18	38	79	13	17	6
July 19	38	79	11	19	8
July 20	39	81	15	16	4
July 21	41	82	15	16	5
July 22	41	73	9	20	6

consumption and enginehouse expense by triple-crewing. During peak movements these factors are also present to an even greater extent. More important, the number of engines required is greatly reduced, a much greater productiveness may be obtained from the heavier power, while the car movement is materially accelerated.

## A.R.A. Ballot Returns— Car Standards Approved

**A**T the American Railway Association, Mechanical Division, meeting, held at Atlantic City, N. J., June 20 to 27, 1928 inclusive, the recommendations of six committees were ordered submitted to letter ballot of the members. The results of these letter ballots made public in circular form by V. R. Hawthorne, secretary of the Mechanical Division, indicate that all committee recommendations received the two-thirds majority requisite for approval except Proposition 2 of the car lubrication committee, relating to dust guards, which has, therefore, been referred back to the committee for further consideration. The most outstanding single feature of the letter ballot returns was the approval of the general designs of hopper cars and automobile-box cars.

**Car Construction.**—The recommendations of this committee were divided into 12 propositions. In accordance with the vote approving Propositions 1, 2, 11 and 12, covering the general design of 50-ton and 70-ton hopper cars, and steel frame, double wood-sheathed automobile-box cars, the Committee on Car Construction will proceed to prepare detailed designs of these cars. In accordance with the favorable vote, Propositions 3 to 10 inclusive, to amend the standard and recommended practice relating to truck details, lumber sections, stake pocket designs, car definitions and designating letters, and standard wheel seat dimensions, have been approved by the A. R. A., effective March 1, 1929.

**Locomotive Design and Construction.**—The recommendations of this committee were divided into five propositions. In accordance with the favorable vote, these propositions to amend the recommended practice of the division as regards main and other crank pins, driving boxes, engine truck boxes, driving and trailer wheel centers, and locomotive pistons and heads, have, accordingly, been approved by the A. R. A., effective March 1, 1929.

**Specifications and Tests for Materials.**—The recommendations of this committee were divided into six propositions, two to revise the standard specifications for air brake and train signal hose, and four to revise the recommended practice specifications for wrapped and braided air, gas and oxygen hose, chain, coupler-

knuckle pivot pins and malleable iron castings. In accordance with the favorable vote, these six propositions to amend the standard and recommended practice of the Division have been approved by the A. R. A., effective March 1, 1929.

**Lubrication of Cars.**—The recommendations of this committee were divided into seven propositions to adopt as standard practice a method of packing journal boxes, specifications for dust guards; journal box packing tools; new waste for journal box packing; rules for inspection of journal boxes, and passenger car lubrication. All of these propositions, except No. 2 relating to dust guards, which did not receive the necessary two-thirds majority vote for approval and has been referred back to the committee, have been approved by the A. R. A., effective March 1, 1929.

**Brakes and Brake Equipment.**—The recommendations of this committee were divided into nine propositions: To modify the channel caliper gage; to adopt as recommended practice brake leverage ratios for passenger cars; also tolerances for brake beam camber; to eliminate from the manual the diagram of the No. 1 tri-valve test rack, and the conversion of all No. 1 racks to No. 2 racks, by Dec. 31, 1929; to limit the increase in size of exhaust ports of triple valves when rebushed; to modify the recommended practice for steam connections for passenger cars; to restore page 8-1923 to Section E of the manual and to revise page 7-1925; to revise the specification for air hose couplings and gages; to require centrifugal dirt collectors on all cars built on or after June 1, 1929. In accordance with the favorable vote, these propositions to amend the standard and recommended practice of the division have been approved by the A. R. A., effective March 1, 1929. The last proposition, involving modification of the interchange rules, is approved effective June 1, 1929.

**Wheels.**—The recommendations of this committee were divided into six propositions: To adopt as recommended practice the reinforced-flange single-plate cast iron wheel; to change the title of the cast-iron-wheel-mounting gage for reinforced-flange wheels and to remove the old gage from the manual; to adopt as standard the old maximum flange gage for minimum flange and restrict the use of the old minimum-flange thickness gage to steel wheels; to adopt the wheel and axle manual as recommended practice; to adopt as recommended practice revised specifications for cast iron wheels; and to revise the wheel defect, worn coupler limit, worn journal collar and journal filet gage. In accordance with the favorable vote, Propositions 1, 2, 3 and 5 to amend the standard and recommended practice of the division have been approved by the A. R. A., effective March 1, 1929; also Proposition 4, involving mostly practices already in effect, has been approved effective as soon as the book can be published and distributed. Proposition 6, to modify the Interchange Rules, has been approved, effective March 1, 1929.

**Locomotive and Car Lighting.**—The recommendation of this committee was confined to one proposition, to revise the recommended practice of the division for specifications for axle-generator equipment. In accordance with the favorable vote, this proposition has been approved by the A. R. A., effective March 1, 1929.

A STATE LEGISLATIVE COMMITTEE of the Brotherhood of Railroad Trainmen, which met at Denver, Colo., recently, has announced that it will have a bill limiting the length of freight trains introduced into the next session of the Colorado legislature. The Brotherhood claims that an excessive number of injuries are caused by trains of more than 100 cars in length.



# Factors in the Economical Buying of Lumber

*Prices and secrets of getting money's worth discussed in National Survey of Forest Products\**

## Part 1

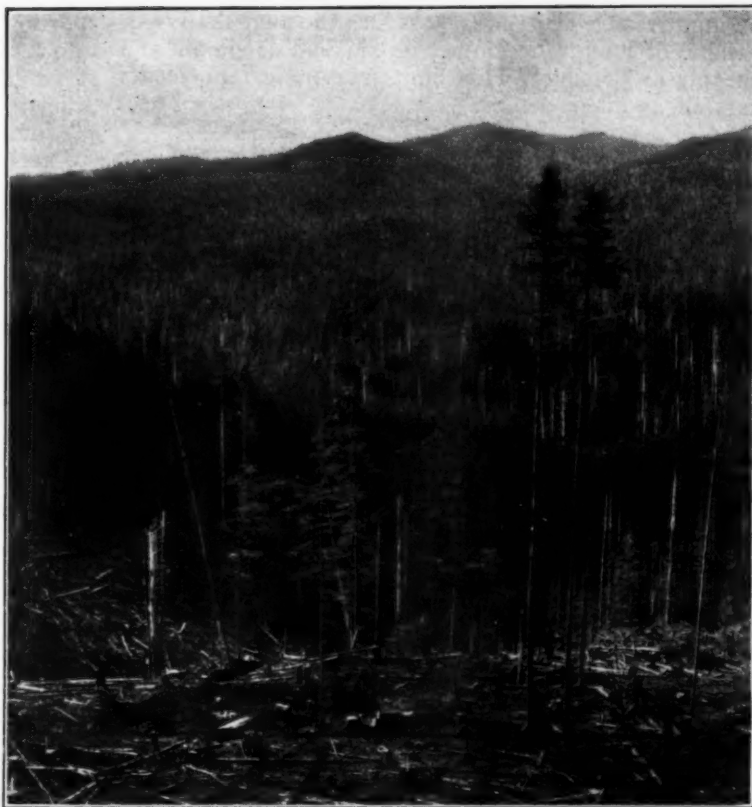
THE national waste that occurs in the field of lumber seasoning, handling and care is of two classes. One is represented by the loss which occurs when a piece of lumber develops defects in the process of air-drying or kiln-drying, such as checking, splitting, warping, or loosening of knots, which results in its being put into a lower grade and its sale at a lower price. This does not directly affect the buyer, because in the lower grade the piece has a value equal to, or perhaps greater than, the average of the other pieces in the grade; but the loss adds to the costs of lumber manufacture and, according to economic law, must be reflected in an increase of the general selling price on saw-mill product as a whole.

The other waste occurs when a piece of lumber is put to a use for which it has not been properly seasoned. For such a use it almost always has a lower value than properly seasoned lumber, the difference exceeding the moderate cost of proper seasoning. This is a waste that occurs in use and falls on the user.

### The Buyer Is King

To secure lumber properly seasoned for use and to protect that condition after it is received, requires an understanding of the factors working effectively in the user's interest and those which have a contrary or limiting effect. The first factor is the user himself. The general rule of all barter is that the buyer has the right of selection. This applies to the seasoning of lumber, as to other qualities. The lumber user is best served in those particulars to which his eyes are alert and gets poor results chiefly in the features to which he does not give proper attention. The buyer is king. If, however,

\* From a report on the seasoning, handling, and care of lumber, prepared by the consumers subcommittee of the National Committee on Wood Utilization, the latter, a co-operative association, established by direction of President Coolidge to work for the closer utilization of the country's timber resources and comprising upwards of one hundred members representing manufacturers, distributors and consumers of lumber and wood products. The National Committee is centered in the Department of Commerce at Washington and is directed by the Secretary of Commerce as chairman and the United States Forester as vice-chairman. The consumers committee includes C. C. Cook, maintenance engineer, Baltimore & Ohio. The survey made in the preparation of the foregoing report, included a study of all published reports on lumber seasoning of the Forest Products laboratories of the United States Forest Service.



In a Western Forest

he pinches the price to the limit and forces the seller to pinch the quality in order to live, he will not in the long run get more than he is willing to pay for.

The lumber distributor is another strong factor by the influence of selection in his purchase. If he does not carry anything in stock but material well seasoned for its purpose, his customers have no chance to make a poor choice; and there are many lumber yards which poorly seasoned lumber does not get into except inadvertently. Such yards buy chiefly from mills which are known by experience to have good seasoning standards. Not all lumber distribution, however, either retail or wholesale, has reached so high a standard. Lumber merchandising has shown wonderful progress, but many yards are still operating as they did 20 years ago.

The lumber manufacturer is also an important factor in the problem, in that lumber, excluding factory lumber kiln-drying, almost universally receives its seasoning at the sawmill. This mill seasoning, is usually seasoning for the intended use, or range of uses. It is almost certain what a piece of ceiling or molding will be used for, and it can be seasoned closely for that specific use; but almost any ordinary item of common lumber may eventually be used for any of a hundred different purposes, indoors or out, and only a broad average of seasoning requirements for use can be struck. In general, the more efficiently the manufacturer seasons, the more salable is his product. The average log, however, produces more common lumber than uppers, and the average manufacturing cost is above the realization of the lower-grade lumber. If the log produces a profit, it must have a sufficient percentage of the better lumber at the higher price. The logs that produce a profit must also carry those that do not, which may be top logs from the same tree or smaller logs from the same tract of timber. It is natural that the better product should have the greater attention and

be improved in every way possible, and that the larger volume of low grade lumber be handled as simply and cheaply as possible. This limits seasoning refinements as well as other details.

#### Much Lumber Poorly Seasoned

Another point not appreciated by the lumber user is that the modern sawmill, with its equipment of modern machinery, represents only part (in some localities a minor and diminishing part) of the total annual lumber production. The oldtime sawmill, producing only rough boards in the days when the carpenter used hand planes for moldings and other worked patterns, has its counterpart in the small sawmill of today that has no planing mill or dry kilns and often no edger or trimmer. In southern pine districts, the proportion of small-mill product has increased until it is now more than half the total production; and in other species there is much small-mill production. Lumber from such mills can be well sawed and as thoroughly air-dried as large-mill production, but much of it is not, and while considerable of this product is concentrated at transit planing mills and there re-worked and refined, much of it goes to market in poor condition of manufacture and seasoning, often in transit carloads sold at forced sale.

Lumber seasoning also has an important relation to transportation costs. It reduces the weight by 30 per cent or more and, therefore, the cost of shipping by rail. As the saving is more than the cost of seasoning, the tendency is toward good seasoning of all rail lumber; although this is not fully accomplished. The general effect, however, is to make the delivered cost lower on seasoned lumber at delivered points at any distance from the mill; and the product costs the consumer no more because of the value added by seasoning and the cost of the process. It is unfortunate if the lumber buyer, when green lumber reaches him at a lower cost than seasoned, accepts it rather than pay a slight premium for seasoned stock which is much less than the greater intrinsic value of the seasoned stock.

Such an attitude of the buyer is an important factor in the appearance of green lumber in eastern markets, brought by cargo from the Pacific coast, a development of the last few years. Seasoning reduces the volume of lumber by 10 per cent or less and thus has a smaller effect on water rates than on rail rates, because the water rates are based on cubic space instead of weight. Dry-kiln equipment that has been installed at western mills manufacturing Douglas fir and west coast hemlock, as well as other western woods, is of better average efficiency than that in use in older manufacturing sections, which includes many old and depreciated installations; but a proportion of the Pacific coast mills are "cargo mills" which have largely shipped their common product in green condition by boat to various markets and it is chiefly these mills which are now shipping green lumber (almost entirely in common grades) to the eastern seaboard.

Large terminal yards have been established on the Atlantic coast, usually equipped with mechanical handling equipment, for receiving and storing cargo lumber; and in some instances the original intention was to season the lumber in such yards by air-drying before distribution. The character of demand has made this difficult, however, and while it was formerly possible to sell about 75 per cent of the stock as seasoned at a premium of about \$3 per thousand feet over green lumber prices, the competitive conditions of the early

portion of 1927 shifted towards a demand for green stock which bid fair to reach a peak of 90 per cent, even though the premium for seasoned stock had declined to around \$1.

Some of the lumber retailers buying this stock expect to get sufficient seasoning in their storage piles before shipment, though a margin of only a dollar is small for that disposition. Some of it goes to factories with dry-kiln facilities, but some of it goes into construction without adequate additional seasoning.

Inequalities of drying introduce another problem. A log which has a moderate amount of moisture in its heartwood may be very wet and heavy in the sapwood, and the heavy boards do not season in the same time as the rest. Also, air-drying and kiln-drying often produce unusual effects on the product, even if it is fairly even when seasoning is begun. Even with an effort to locate and cull the heavier boards, some are shipped. If the stock produces a fair average shipping weight, it may be passed, but in use the heavy board gives results based on what it is itself. Actual tests of stock as shipped from almost any mill will show that a percentage of it does not reach the reasonable standard of seasoning acceptable for use, especially during the winter months when atmospheric conditions tend to make lumber heavier instead of lighter.

As a whole, the lumber industry has not reached the point where the lumber user can rely upon the seasoned condition of lumber offered without the exercise of proper caution in his own behalf. The recognition and enforcement of proper standards by the user would establish them; without his co-operation, advance toward such standards will be slow.

Wood is seasoned chiefly to increase its value. One factor, however, that has been powerful in influencing general and thorough seasoning has been the reduction in weight and the consequent reduction in freight charges. Nominally, the manufacturer gets the benefit, as his quoted price for a given destination includes an estimated freight charge, and he may season to a lower weight than that estimated and pocket the difference. Competition, however, usually gives the benefit to the buyer, and as the saving is more than the cost of seasoning except on very short movements, the buyer gets a more valuable seasoned product at a lower price than for green lumber.

Seasoning also puts lumber in condition for shipment without danger of stain, mildew, or decay in transit. A few species may be closed piled in transit for a reasonable period without much danger of damage, but they are exceptional.

Wood can be decomposed only by heat, strong alkalies or acids, or combustion, or by the activities of various kinds of fungi which feed upon wood substance and secrete enzymes that have power to dissolve it. These can flourish only within a certain range of temperature and moisture in the wood and air supply, though they may remain dormant for considerable periods under unfavorable conditions. Wood completely immersed will remain free from decay indefinitely, because these fungi can not live under water; nor can they feed on dry wood. The degree of seasoning adequate for other purposes is always sufficient to protect it from fungous attack; for when wood has reached the point where shrinkage begins, its real seasoning for use is commencing, but it is already passing out of the zone where fungous attack is probable.

There are a large number of insects that bore holes in wood in either the larval or adult stage. Some of these work in five trees but most of them in moist wood



of dead or fallen timber, logs, etc. Seasoning wood protects it from the attack of most of these insects.

### Seasoning Strengthens Wood

Some of the important strength characteristics of wood are increased by seasoning, a few fourfold or more in drying green specimens from the green to the oven-dry condition. Impact strength, or ability to resist shocks, may be decreased. In commercial timbers of common grades, containing knots and other defects, the increase in strength may be largely offset by further defects, such as checks, which develop in seasoning. Recommended practice, therefore, is to base timber stresses on green strength, making some allowance for higher stresses for timber used in dry or protected locations.

For most of the purposes for which wood is used, particularly in assembled form, the shrinkage produced by seasoning is the most important effect. Where wood is cut to definite patterns and dimensions, for use where appearance may be more important than strength, and where decay need not be expected; it is chiefly important that the wood shall maintain its size and form.

All that seasoning can accomplish is to bring wood into fair correlation with its range of moisture content in use. For the upper grades of wood used in exposed work it is considered best to season and shrink wood to about the lowest portion of its later range, and such grades are nearly always kiln-dried. For the common grades of lumber uses (usually hidden uses), it is considered sufficient to air-dry the wood, and if it afterwards seasons more thoroughly and shrinks a little more, this does no particular harm if proper design is used.

### How Wood Shrinks

The point where shrinkage begins is called the "fiber saturation point" and is usually at about 25 per cent of moisture content, although it varies from 20 to 35 per cent. Shrinkage begins at this point with most species. In seasoning, however, the outer zone reaches this condition before the interior, and thus a piece may begin to show shrinkage while its average moisture content may be above 40 per cent.

The cells in wood have almost no endwise shrinkage, while the lateral or crosswise shrinkage is nearly twice as much along the annual rings as across them. A quarter-sawed board shrinks less in width than flat-sawed lumber, and the latter also tends to cup on the side toward the bark. Most lumber dries flat, because the weight of lumber above it in the pile prevents it from cupping, and it will usually remain flat unless swelling and shrinking occur from subsequent absorption of moisture.

The table gives the principal building softwoods and some representative hardwood species, with their shrinkage in seasoning.

It will be noted that some woods having high green water percentage have low shrinkage, and in others high shrinkage is associated with a low percentage of water in the green state. The moisture percentages are those found in the specimens at the time of testing and are not intended to represent average green moisture contents for the respective species, which may be considerably higher in some cases. The shrinkage shown is that which occurs in seasoning to an oven-dry condition. Only about half of that shrinkage occurs in seasoning to equilibrium with average air conditions or thoroughly air-dry, and average kiln-drying produces only about 75 per cent of the shrinkage shown. From the point where shrinkage begins (20 to 35 per cent,

average 25 per cent.) it usually has a fairly constant ratio to the amount of water removed.

### Thorough Seasoning Not Always Needed

In the range of commercial seasoning from moderately air-dry to thoroughly kiln-dried, wood is suitable for practically every use, and it is not necessary to carry green lumber, for there are no uses for which it is sufficiently better to make it worth while or for which seasoned wood can not be adapted.

If for any particular purpose green or partially green

Wood	Shrinkage per cent		Green per cent of water
	Radial	Tangential	
Softwood			
Cedar, western red .....	2.5	5.1	39
Cypress, bald .....	3.8	6.0	87
Douglas fir .....	5.0	7.9	36
Hemlock, eastern .....	3.0	6.4	105
Hemlock, western .....	4.5	7.9	71
Pine, loblolly .....	5.5	7.5	70
Pine, long-leaf .....	5.3	7.5	47
Pine, Norway .....	4.6	7.2	54
Pine, short-leaf .....	5.1	8.2	64
Pine, sugar, California .....	2.9	5.6	123
Pine, western white .....	4.1	7.4	58
Pine, western yellow .....	3.9	6.4	95
Pine, white, Wisconsin .....	2.2	5.9	74
Spruce, Sitka .....	4.5	7.4	53
Hardwood			
Birch, yellow .....	7.4	9.0	68
Butternut .....	2.3	6.1	104
Chestnut .....	3.4	6.7	122
Cottonwood .....	3.9	9.2	111
Gum, red .....	5.2	9.9	81
Maple, sugar .....	4.8	9.2	60
Oak, red .....	3.9	8.3	84
Oak, white .....	5.3	9.0	68
Poplar, yellow .....	4.1	6.9	64
Sycamore .....	5.1	7.0	83
Walnut, black .....	5.2	7.1	81

lumber is considered best, the condition can usually be met most economically by adding moisture to seasoned stock, especially where the cost of original seasoning has been more than compensated by savings in the transportation costs.

Whether air-drying or kiln-drying should be chosen for seasoning may depend upon conditions. In air-drying lumber, whatever weather happens must be used, while in good kiln-drying, the conditions are under full control to produce the desired effect of good seasoning in the best manner. On the other hand, there is often a strong preference for air-seasoned material. In air-drying the exterior becomes dry usually some time before the center, and the latter part of the period is chiefly occupied in coaxing the surplus moisture from the center. The process is so slow, however, that the wood has time to readjust itself and absorb stresses produced by the uneven drying, and while some woods suffer much damage, most of them emerge in fairly good shape. In commercial kiln-drying there is often heavy departure from the best practice, both in character of kilns and in operating care. The lumber is often baked instead of dried with a proper balance maintained between heat and humidity, and if it comes through in fair shape, it is because of the easy drying qualities of the species.

"Kiln-dried" as applied to common lumber merely indicates the method of seasoning and not the degree, which may be anything from under 10 to over 20 per cent moisture. For thorough seasoning, well kiln-dried lumber should be specified. For moderate seasoning, uniform seasoning should be specified, whether it is obtained by air-drying or kiln-drying.

### Indicate Desired Seasoning

Most of the bargaining over lumber purchases is regarding price, and 50 cents a thousand feet may decide the issue, but a difference in dryness actually ratable in money as several times that amount may be disregarded entirely. That this does not happen often is owing more to service standards of the lumber dealer than to

vigilance of the buyer; but if more lumber buyers were alive to the importance of proper seasoning and understood what it was, there would be more encouragement to good service standards. On the other hand, it would be detrimental if particularity regarding the seasoned condition should in some cases go to the point of demanding a specially low moisture content in a grade of lumber where air-dry is a better adjustment for the intended use and is the common condition of the kind of stock available.

The exact way is to state the acceptable range of dryness percentages. Where consumers of lumber are not equipped to guard the dryness of lumber by tests, the next best plan is to choose the careful dealer.

The standing of the lumber manufacturer, as well as of the lumber dealer, is also an index of the kind of lumber, in respect to seasoning as well as quality; and if the lumber is grade marked with the name of the manufacturer (or the mill number of the association, which means the same thing), it shows that the mill is standing behind its product and is probably looking well to the seasoning as well as the grade. The specification behind the mark may not include a specification of seasoning, but the practice of the mill itself is pretty apt to include it; and the grade mark in time serves to single out those mills whose product is found regularly satisfactory in dryness.

If the lumber consumer wants to make a real price saving on his purchases, moreover, he can often accomplish it better by choosing lumber of shorter lengths than by buying long lumber whose condition of seasoning is dubious.

*A second article on this subject will appear in a later issue.*

## A New Type of Car Retarder

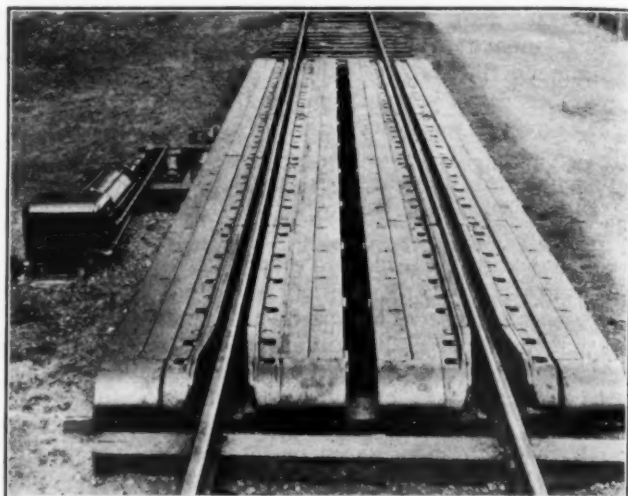
**T**HE Union Switch & Signal Company has placed on the market a new car retarder which it terms Model-28 and which incorporates new features that provide greater power, strength and flexibility than has been offered heretofore. The Model-28 retarder has extremely flexible control and is economical in air consumption. The pressure in the cylinder, and hence the value of retardation, automatically follows the position of the control lever. In other words, with a car in the retarder, the retardation may be increased or decreased from any one of the four pressures to any other, thus providing constant and instant control over the car in its passage through the retarder.

The last position of the control lever sets up full cylinder pressure, and an automatic change of piston stroke is provided on this last position. This change of piston stroke, when not more than two pairs of wheels are in the retarder, permits advantage to be taken of the full strength of the springs and automatically eliminates any reaction on the piston, but without sacrifice of the equalizing and centering feature.

The leverage system of the Union Model-28 retarder equalizes all inner brake shoes with all outer brake shoes, and in that way provides a centering force to keep the center line of trucks over the center line of the track. This characteristic effectually prevents the derailment of a car within the retarder. Even if a car is lifted from the rails through misjudgment on the part of the operator, the centering feature results in the wheels dropping into proper position on the rails when the car leaves the retarder. Another important fea-

ture is the special arrangement of the retarder brake beams, which causes them to rise about an inch as the brake shoes grip the wheels. The shoes rise with the beams and gain an additional leverage which increases the retarding effect. This is obtained without loss in clearance, since the shoes are raised only after they have engaged the wheels.

Zerk fittings and bronze bushings are used on all close bearings to insure adequate lubrication, minimize



The New Retarder Is of the Covered Type

the labor connected with it, and give the parts of the retarder a long life. Adjustment for brake shoe wear has been simplified to a minimum as this is made at but two points. The covering of all working parts protects wearing surfaces from dirt and weather, and avoids damage in case a car is dragged over the retarder on account of a derailment outside of it. The smooth top surface, forming the covering and the curved ends, also avoids damage to or from dragging equipment and makes cleaning easy.

On account of the construction of the retarder, the stresses developed in operation are internal to the retarder structure and, therefore, do not react on the ties. Practically no framing of ties is required and all working parts are above the ballast. The main assemblies are grouped in such a manner that they may be installed with a minimum interruption of the traffic through the yard.

\* \* \*



Special Train of 42 Cars Which Carried All Girders for the Lackawanna's New Hackensack River Bridge



# Gulf, Mobile & Northern

*Continues improvement in operating efficiency indices—  
Car miles per day up 223 per cent in seven years*

**D**URING the first eight months of the current year the Gulf, Mobile & Northern averaged 18,785 gross ton-miles per train-hour as against 9017 in the same period of 1921 and 16,840 last year, an improvement of 108.3 per cent and 11.5 per cent respectively. Cars per train and gross and net tons per train in the nine-months period this year showed increases of better than 75 per cent over the same period of 1921 and of more than 10 per cent over last year. These comparisons are set down in detail in Table 1.

## Improvement in Car Miles Per Day

One of the most striking improvements which has been effected in the past seven years has been in car-miles per car-day. It will be noted that this average stood at 16.3 for the first eight months of 1921, 50.6 for the same period of 1927 and 52.6 for the first eight months of 1928. This improvement has been in large measure due to a change in equipment maintenance practices. In 1921 maintenance of equipment expenses totaled 19.3 per cent of operating revenue; in 1927 only 15.2 per cent. In 1921 the per cent of unserviceable cars to total averaged 31.6; in 1927 this had been reduced to 3.8 per cent. Similarly unserviceable freight locomotives were reduced from 21.5 per cent of the total in 1921 to 17.2 per cent in 1927.

Formerly the Gulf, Mobile & Northern worked its shops to capacity during the rush period and virtually discontinued maintenance work in slack seasons. The result was that the organization was frequently completely disrupted and the better class of employees would seek work which provided more in the way of permanence. This situation has been completely changed. The organization is kept intact all year round and advantage is taken of slack periods to reduce the accumulation of bad-order cars. This change in policy has as noted above, materially reduced the maintenance

of equipment ratio and has aided materially in bringing about the increase of 223 per cent in average car-miles per car-day.

## Expansion and Improvement

The operations of the Gulf, Mobile & Northern and the carrying out of its policy of expansion were described in an article which appeared in the *Railway Age* of March 26, 1927. Summarized briefly, development of the property since the end of federal control has consisted of converting the road from little more than a local facility to a common carrier serving an impor-



The Gulf, Mobile & Northern

Table 1—Average Freight Performance

First Eight Months of 1921, 1927, 1928 Compared

	1921	1927	1928	% change 1928 compared with 1921	% change 1928 compared with 1927
Cars per Train.....	20.5	33.8	37.8	+ 84.4	+ 11.8
Gross Tons per Train (Exclud- ing Locomotive and Tender)...	771	1293	1442	+ 87.0	+ 11.5
Net Tons per Train.....	382	606	668	+ 74.9	+ 10.2
Net Ton Miles per Mile of Road per Day .....	1352	2549	2656	+ 96.4	+ 4.2
Train Miles per Train Hour....	11.7	13.0	13.0	+ 11.1	—
Gross Ton Miles per Train Hour (Excluding Loco. & Tender)...	9017	16840	18785	+108.3	+ 11.5
Net Ton Miles per Train Hour..	4469	7890	8702	+ 94.7	+ 10.3
Net Ton Miles per Car Day....	320	934	955	+198.4	+ 2.2
Car Miles per Car per Day....	16.3	50.6	52.6	+222.7	+ 4.0
Lbs. Coal per 1000 Gross Ton Miles (incl. Loco. & Tender)...	189	123	114	— 39.7	— 7.3
Miles per Locomotive Day .....	55.4	87.6	79.7	+ 43.8	— 9.1

tant part with a growing traffic. To this end it has built extensions and secured trackage rights to provide better connections and has built up its property physically and increased its operating efficiency to enable it to function satisfactorily as a competitor for through business.

The road acquired control of the Meridan & Memphis in 1918 and of the Birmingham & North Western in 1924. In 1919 it extended its line northward to Jackson, Tenn., to a number of valuable traffic connections. In 1926 trackage rights were secured over the Nashville, Chattanooga & St. Louis from Jackson, Tenn., to Paducah, Ky., where a reciprocal traffic interchange with the Burlington is effected. A similar arrangement was made with the New Orleans Great Northern at Jackson, Miss., and the G. M. and N. acquired the Jackson & Eastern and extended it to form this connection. The road's many connections give it a wider distribution for its traffic and its reciprocal agreements with the N. O. G. N. and the C. B. Q. make it a main link in a through traffic route between northern centers of population and New Orleans, as well as Mobile.

From a physical standpoint the road has progressed steadily in building up its plant. At the end of 1927, 59 per cent of its main line mileage had rail of 85 or 90-lb. section. Thirty-one per cent of main line mileage was ballasted with slag and 65 per cent with gravel. Seventy-four per cent of main line ties were creosoted. Each year shows a substantial increase in the percentage of line brought up to these standards.

Not only has the railroad brought up its track for the handling of heavier trains but it has made such trains

possible by providing power to handle them. The average tractive power of its freight locomotives at the end of 1923 was 35,600 lb. In September of the current year this figure had risen to 49,896 or 40 per cent. The provision of locomotives sufficiently large to handle trains of remunerative size as well as track able to stand

ject. Frequent bulletins, attractively prepared, are issued, to show comparative performance. In 1923 the road's casualty rate per million man-hours was 30.89. This was steadily reduced to 12.02 in 1927 and was only 3.10 for the first nine months of the current year. As a matter of fact, success in arousing the interest of

Table 2—Gulf, Mobile & Northern, Operating Results, Selected Items, 1916 to 1927

Year	Average mileage operated	Revenue ton miles	Revenue passenger miles	Rev. per ton mile cents	Total operating revenues	Total operating expenses	Net operating revenue	Operating ratio	Net railway operating income	Net after charges	Net charges for additions and betterments
1916	402	134,334,279	11,704,950	1.22	\$2,051,088	\$1,486,395	\$564,693	72.47	—	—	—
1917	402	137,285,504	12,543,940	1.357	2,322,650	1,589,401	733,249	68.43	—	—	—
1918	424	125,774,952	15,058,994	1.484	2,418,292	2,168,070	250,222	89.10	\$200,289	122,861	1,201,844
1919	438	111,074,724	19,308,501	1.902	2,823,506	2,847,579	—24,072	100.85	—98,977	—189,156	856,682
1920	470	216,241,510	23,380,047	1.471	4,147,960	4,909,102	—761,141	118.34	—1,034,097	—815,224	543,871
1921	454	219,546,943	13,976,145	1.552	4,086,217	3,653,018	433,199	89.39	98,870	44,588	536,242
1922	437	272,380,212	11,812,685	1.443	4,541,439	3,320,393	1,221,045	73.11	791,223	744,340	771,596
1923	466	391,446,479	14,799,752	1.327	5,944,549	4,459,952	1,484,597	75.03	955,307	940,497	834,699
1924	466	425,595,743	13,399,288	1.267	6,088,030	4,366,287	1,721,743	71.72	1,211,976	1,122,223	592,276
1925	466	418,848,758	11,718,085	1.353	6,321,033	4,338,042	1,982,991	68.63	1,389,970	1,298,050	644,623
1926*	527	441,322,377	11,348,085	1.298	6,369,584	4,340,927	2,028,657	68.15	1,412,885	1,319,428	562,820
1927*	678	547,724,425	12,314,087	1.172	7,099,497	5,125,615	1,973,882	72.20	1,267,753	1,054,194	572,677

Standard return for operations during federal control or average annual net railway operating income for three years ended June 30, 1917 was \$558,338. \* Includes Birmingham & North Western from May 1, 1926, and Jackson & Eastern from August 15, 1926.

heavier traffic, has brought about the great increase in the average number of cars per train and the improvement in train speed in the face of these heavier train loads. In recent years the road in acquiring new freight power has standardized on a heavy Decapod of more than 60,000 lb. tractive force.

The following is a comparison of the road's traffic in 1927 with that of 1917:

	1927		1917	
	Tons	% of Total	Tons	% of Total
Products of Agriculture...	362,850	12.51	137,001	10.18
Animals and Products...	13,643	0.47	7,504	0.56
Products of Mines...	529,057	18.23	85,781	6.37
Products of Forests...	1,345,021	46.36	939,509	69.79
Manufactures & Misc...	584,895	20.16	116,416	8.65
L. C. L.	65,917	2.27	59,942	4.45
Total	2,901,383	100.00	1,346,153	100.00

With the development of business through connections the road is becoming less dependent each year on forest products for its business. In 1917 the road originated 78 per cent of its traffic. In 1927 this percentage had declined to 55 per cent. While the margin of profit on business received from connections is less than on business originated, the reduction is more than compensated for by the decreasing reliance on an extractive industry—lumbering—for a livelihood.

#### Interest Employees in Efficiency

The management of the Gulf, Mobile & Northern has endeavored with considerable success to interest its employees in its operating performance, using accident—or rather safety—figures as an introduction to the sub-

employees in the property has been general. One phase of this progress which has been especially marked—that of soliciting business—was described in an article which appeared in the *Railway Age* of August 13, 1927, page 291.

The capital structure of the G. M. & N. is simple. It has outstanding \$22,411,700 of stock—about half of

Table 3—Revenues and Expenses  
First 9 Months of 1926, 1927 and 1928 Compared

	1926	1927	1928
Average Mileage	498	680	733
Operating Revenues			
Freight	\$4,217,906	\$4,831,106	\$4,996,738
Passenger	281,757	300,168	275,939
Total (Inc. Misc.)	4,692,749	5,340,184	5,500,489
Operating Expenses			
Maintenance of Way	759,257	997,850	997,037
Maintenance of Equipment	718,671	845,924	834,837
Traffic	225,659	272,018	288,043
Transportation	1,301,086	1,586,164	1,679,358
General	206,573	252,006	249,299
Total	3,212,648	3,956,070	4,050,834
Operating Ratio	68.46	73.08	73.64
Net from Railway Operation	\$1,480,101	\$1,384,114	\$1,449,655
Operating Income	1,075,669	1,047,805	1,179,022
Net Railway Operating Income	1,024,005	833,879	869,971

which is 6 per cent cumulative preferred—and \$7,000,000 of bonds. Dividends are being paid regularly on the preferred stock, but there is a back accumulation of 16½ per cent to be disposed of before the common can hope to receive anything. To meet these back dividends \$1,883,574 would be required. The profit and loss credit balance at the end of 1927 stood at \$4,613,736. Net income in 1927 totaled \$1,054,194—equivalent to \$9.23 on the outstanding preferred stock.



Suburban Power on the Rock Island at Chicago



## Automobile Baggage Car on Southern Pacific

**I**N order to accommodate passengers desiring the use of their own automobiles at the conclusion of long rail trips, the Southern Pacific has initiated what is believed to be the first attempt at combination automobile and passenger-carrying service. This service, recently established between San Francisco, Cal., and Del Monte, will probably also be tried out between San Francisco and Merced to handle automobiles moving to Yosemite Valley. It is hoped in this way not only to provide a convenience for present passengers but to attract considerable additional business which would otherwise be lost to the highways.

When accompanied by a passenger holding regular transportation good for use on Trains 27 or 28, the new service makes it possible to transport an automobile between San Francisco and Del Monte in a passenger-train baggage car at the following rates: One way \$12; round trip \$24; this tariff, however, not applying for the transportation of automobiles to points between San Francisco and Del Monte.

When an automobile is to be transported by this service, the agent makes an examination for damage or defects of any kind and notes on the automobile excess baggage check any apparent damage or unusual conditions. All gasoline is drained from the tank either by the passenger or the company's agent. The amount of gasoline drained is noted on the excess baggage check and an equivalent quantity furnished by the company without charge on arrival at destination. Only standard fixed parts actually constituting necessary portions of the automobile chassis, engine, body, running board or top, may be shipped as parts of the automobile.

If, for any reason, it is impossible to handle an auto-

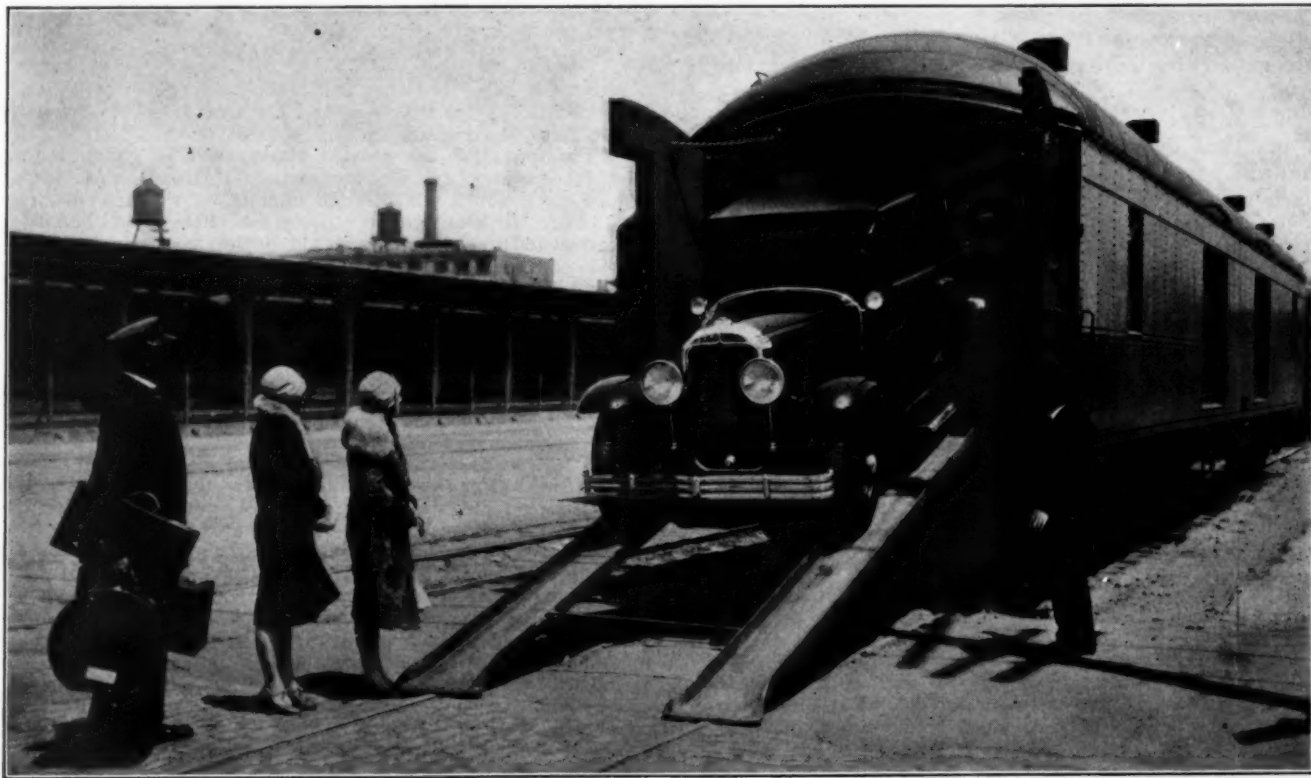
mobile on the same train as the passenger, it may be handled at the same rates on Train 27 or 28 the day following the one on which the passenger travels.

Agents at San Francisco and Del Monte issue regular excess baggage checks to take care of these movements, collections being made at the time of issuance of the checks. Passengers desiring to have automobiles checked are expected to give the ticket agent an hour or more advance notice, and all automobiles are delivered to the agent not later than 30 minutes before the schedule time of train departure. At destination, the automobiles are unloaded within a reasonable time which permits switching the baggage car to the unloading platform.

The car in which the automobiles are loaded is a double-end-door baggage car, the loading being accomplished by running the car up a pair of steel ramps. One pair of these ramps is kept at San Francisco and another pair at Del Monte for this service. The car is placed at the baggage platform; when loaded it is placed next to the locomotive. After the train has stopped to detrain passengers at Del Monte, the car is cut off and switched onto an adjacent auxiliary track where automobiles are unloaded.

Automobiles, when loaded, are blocked inside the car in strict accord with standard loading rules, regulation chock blocks being placed on each side of each wheel and nailed to the floor; then new burlap ties, made by folding burlap into six thicknesses, are passed through the spokes and over the rims and nailed down to the floor on each side with ten penny nails.

When the double end doors of the car are open, they provide an unobstructed opening for practically the full width of the car. In each door is framed half of a standard passenger car door way. When the large doors are closed, this passage is closed by a sliding door, which may be seen in its open position attached to the swinging door at the right in the illustration.

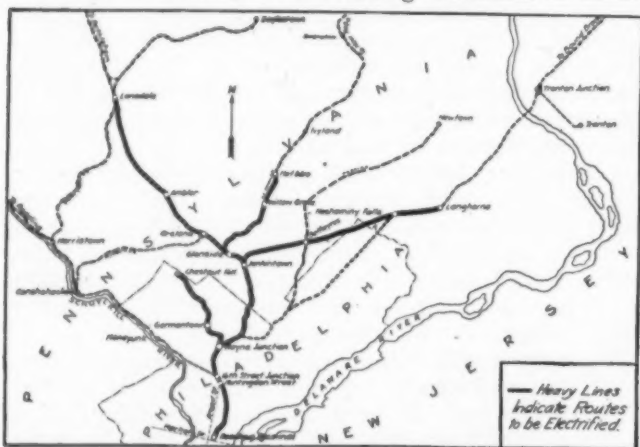


Operation of Unloading Automobile from Baggage Car Used in New Automobile-Passenger Carrying Service on the Southern Pacific

## Reading Electrification to Include 110 Miles of Track

**T**ENTATIVE plans for the electrification of the Reading Company were published in the *Railway Age* of December 17, 1927. Present development of these plans is outlined in a statement made Monday, November 12, by Agnew T. Dice, president of the Reading Company.

Electrification of a major portion of the Reading system in the metropolitan area of Philadelphia is to be the first step, with probable ultimate extensions to New York, Bethlehem and through the Schuylkill valley territory. The board of directors has given final approval to the plans of the railroad management calling for the immediate expenditure of \$20,000,000. for the electrification of the lines from Reading Terminal to Lans-



Reading Lines in the Vicinity of Philadelphia

dale, Glenside to Hatboro, Jenkintown to Langhorne and the Chestnut Hill Branch. The route distance is 49.9 miles with 110 miles of track.

Mr. Dice announced that the electrification program will insure approximately 25 per cent daily increase in service to the towns and cities in the territory with a saving in time to and from Philadelphia of from 20 to 25 per cent over present steam train schedules. One hundred of the most modern electric multiple unit coaches will be placed in the service.

Supplementing the official statement, Mr. Dice said: "The engineering phases of the electrification plans are virtually complete and, with final authority granted by the board of directors, construction will begin within a few months.

"It will be noted that the lines to be electrified are on through routes embracing the commuting territory of Philadelphia. While no official action has been taken and none probably will be until the first routes are in operation, I believe it is safe to say that ultimately the electrification will extend from Langhorne to New York, from Jenkintown to Bethlehem and after the completion of grade crossing elimination at Manayunk through the Schuylkill valley to Reading and Pottsville."

The official statement follows:

The board of directors of Reading Company has approved plans for the electrification of a major portion of the Reading Railway System in the metropolitan district of Philadelphia for the operation initially of most of the suburban trains in this area.

The following lines will be electrified: Reading Terminal to Lansdale; Glenside to Hatboro; Jenkintown to Langhorne and the Chestnut Hill Branch. This includes the electrification of all four main tracks between Reading Terminal and Wayne Junction, and of the two tracks from Wayne Junction to Lansdale, Langhorne and Chestnut Hill.

It has been decided to use single phase alternating current at 11,000 volts for propulsion of trains. Overhead trolley wires will be installed and the pantograph type of current collector will be used on cars and locomotives. This wiring will require steel bridges at intervals of about 300 ft. throughout the area of electrification. Active progress is now being made on the extensive detailed plans required. The erection of the catenary overhead wiring will be the first physical work undertaken and it is planned to begin construction at outlying points. The work will then proceed toward the more congested part of the railroad system. The railroad will build a number of substations at various points for the most effective and reliable distribution of power to all parts of the system.

One hundred multiple unit coaches of the most modern design will be placed in service, releasing 35 steam locomotives now in use and also 120 steam coaches which will be diverted to service at other points on the system. These cars may be operated separately or combined as trains from one to ten cars each. These coaches will be propelled by their own motors and trains will be capable of speeds as high as 70 miles an hour, which will be independent of the number of cars operated as one train. They will also be able to accelerate to full speed in very much shorter time than the present steam trains, and will maintain high speeds on heavy grades as well as on level track. It will thus be possible to maintain considerably higher average speed throughout all portions of the runs.

Probably the most important phase of the electrification to be called to the attention of the residents of this territory is the increase in frequency of service as well as speeding up of all trains in this territory. This service will give the cities and towns an average of approximately 25 per cent increase in daily train service with a 20 to 25 per cent saving in time to and from Reading terminal. The new arrangement will provide express service to the outlying territory throughout the day, instead of providing only local trains at certain times as at present. Better connections at junction points with through trains will be provided. All electric and steam trains will stop at the new North Broad Street station which will have underground connection with the Broad Street subway.

It is obvious that the modernizing of service will be of the utmost importance to the territory north and northeast of Philadelphia. It has been the universal experience that following electrification of a railroad bringing with it faster and more frequent service communities multiply and grow with astonishing rapidity. Enhancement of real estate values follows and the elimination of smoke and noise permits the development of property for home building purposes adjacent to the tracks.

At Wayne Junction a large coach storage yard and electrical repair shop will be erected on the ground between Chestnut Hill and the Tabor branches and immediately north of Wayne Junction Station, for which ground has already been purchased by the railroad company.

At Chestnut Hill the present station will be changed for electrical operation and facilities will be enlarged to provide a storage yard for a considerable number of the new electric motor cars. At a number of other points changes will be made in station and track facilities to aid in the operation of a high type of electric service.

Coincident with the electrification the company will install modern color light signals in the entire territory, which will replace the present semaphores and Hall "banjo" type signals. All the equipment will be designed specially for the Reading Company and include many features never before adopted in an electrification program of this magnitude.

According to a previous announcement of the company, plans had been made for the electrification of the Chestnut Hill Branch as the first step in the program. The revised plans, however, will place this branch last, due to the fact that negotiations between the city and the railroad for the elimination of grade crossings have not been consummated.

At the same time tentative plans are being made to include electrification on the Norristown Branch when the present grade crossing elimination program is completed throughout the Manayunk section. Moreover, the plans in all sections are being developed in such a way that it will be possible to extend the service without altering the initial installation, to include through passenger and freight electrification at such time as the company shall find this extension of electrification justifiable.

The total cost of the electrification program will be approximately \$20,000,000. Three years will be required to complete the work.

The engineering plans and supervision of construction will be under the direction of Charles H. Ewing, vice-president, Clark Dillenbeck, chief engineer, and George I. Wright, engineer electric traction.



# Texas & Pacific Fuel Conservation Program

*Six-year program has effected marked reductions in unit consumption on an oil-burning road*

**A**S PART of a program for disseminating information regarding Texas & Pacific fuel conservation accomplishments and objectives, this road has recently issued an attractively-prepared 18-

**Table I—Av. Gals. of Oil Per 1,000 Gross Ton-Miles (Freight, and Passenger Service) and Per Switch-Engine Mile**

	1922	1923	1924	1925	1926	1927
Passenger service .....	21.9	21.1	18.9	17.4	15.6	14.9
Freight service .....	14.9	14.2	13.3	12.1	10.7	10.4
Switch service .....	11.8	11.5	11.3	10.4	10.4	10.7

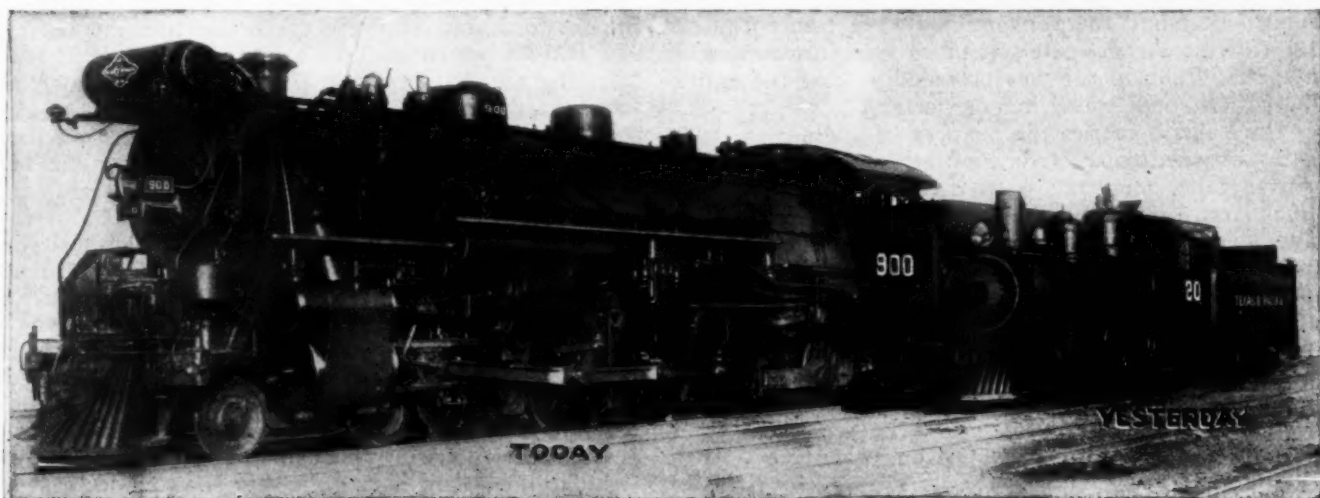
page bulletin or "Souvenir Program," setting forth the general history of fuel conservation efforts on the Texas & Pacific during the past six years.

The consistent decrease in unit fuel consumption,

The advantage of using powerful, modern locomotives as compared to older, less efficient power, is well illustrated in Table III, which indicates a saving of roughly 25 per cent in unit fuel consumption with the Texas 2-10-4 type locomotive and an increase of 15 to 25 per cent in train loading, depending upon whether the comparison is made with a 2-10-2 type locomotive having a booster or one not so equipped.

## Consistent Growth of Freight Traffic

The consistent growth in freight traffic handled is shown by months for the years 1922 to 1928, inclusive, in Table IV. These monthly figures continued to increase in the early part of 1928 and passed the million mark in the month of May.



**Comparison of Modern Mountain Type and Early 4-4-0 Type Locomotives on the Texas & Pacific**

particularly in passenger and freight service, is shown in Table I, the aggregate savings each year, as com-

**Table II—Cars of Oil Saved by the Decrease in Unit Fuel Consumption**

	1923	1924	1925	1926	1927
Passenger service .....	108	308	211	259	101
Freight service .....	294	434	645	793	218
Switch service .....	40	29	140	...	48
Total .....	442	771	996	1052	271

*Italic Figures denote loss.*

pared with the previous year, expressed in cars of oil, being given in Table II.

The necessity for more intensive fuel economy efforts was made evident to the management of the Texas & Pacific by fuel performance reports in 1922. Educational meetings were inaugurated at different terminals on each division. As noted in the foreword of the bulletin "The educational features of the meetings were fourfold; first, the necessity for, and duty of each, and every officer and employee to aid in this work; second, the ways in which each officer, and employee could aid in the work; third, the discovery of conditions which adversely affected fuel economy, de-

**Table IV—System Gross Ton Miles—Thousands**

	1922	1923	1924	1925	1926	1927
January .....	340,709	367,355	397,880	427,458	463,055	578,536
February .....	288,355	306,120	374,167	385,041	426,548	556,151
March .....	297,335	350,731	383,727	436,983	464,552	634,241
April .....	265,455	329,338	352,387	444,500	430,786	641,713
May .....	291,335	325,208	371,421	401,627	490,778	605,914
June .....	296,933	287,991	351,458	420,662	457,840	620,435
July .....	257,487	317,077	414,588	429,337	473,171	581,108
August .....	316,005	339,526	435,065	471,614	451,628	499,202
September .....	314,924	345,031	406,158	473,180	431,526	523,872
October .....	328,997	401,237	445,812	466,072	493,827	617,150
November .....	366,773	409,734	426,628	468,944	464,348	619,619
December .....	388,143	388,880	428,514	471,852	508,478	661,296
Total .....	3,752,451	4,168,228	4,787,805	5,297,270	5,556,537	7,139,237

veloped through informal discussion; fourth, revelation of the interdependence of the different departments, and instilling the spirit of teamwork and co-operation."

#### Meetings A Success from Start

The success of the meetings was demonstrated from the start. To provide added incentive for fuel economy, the practice was established in 1923 of awarding the engineer and fireman, on each division, effecting the greatest per cent of saving in the use of fuel, a trip to the International Railway Fuel Association convention at Chicago. The delegates' expenses were al-

Table III—Relation of Super Power Locomotives to Fuel Economy

	Calendar year 1927		
	Texas Type	2-10-2 with booster	2-10-2 without booster
Total mileage .....	710,715	296,566	1,167,128
Average ton-miles per train-mile...	2,313	2,023	1,638
Per cent engine utility.....	70.5	80.0	78.0
Gallons oil per 1,000 gross ton-miles	7.6	10.2	10.6
Compared with 2-10-2 with booster:			
Per cent reduced fuel consumption	25.5		
Per cent increased train loading....	14.3		
Compared with 2-10-2 without booster:			
Per cent reduced fuel consumption	28.3	3.8	
Per cent increased train loading....	25.9	10.2	

lowed, also the regular rate of pay for the time consumed attending the convention. Free transportation for each of the delegate's families was furnished and a special Pullman car was provided so that the entire delegation could travel in one party.

The bulletin carries the pictures of enginemen delegates awarded trips to the convention for two or more years. The complete list of delegates to the conventions from 1924 to 1928 is shown on another page. Still another page carries a record of selected road trips in which engine crews have made unusual records in fuel performance. These records indicate fuel consumptions as low as 14.8 gals. of oil per 1,000 gross ton-miles in local freight service; 9.2 gals. in local passenger service; 6.2 gals. in through passenger service and 3.0 gals. in through freight service.

#### High Cost of Fuel Oil an Incentive

One important factor in the fuel economy efforts on the Texas & Pacific has been the general desire to use oil as a fuel. During the years 1925 and 1926 the price of fuel oil advanced constantly, until the cost had practically become prohibitive, and indicated the necessity of providing for another grade of fuel. Experiments were made with lignite, and results indicated that this fuel could be successfully used by locomotives. The advantage of burning fuel oil on locomotives, however, was appreciated, and the necessity for utmost economy in the use of this fuel was stressed in fuel conservation meetings at that time. Attention was called to the fact that only by a drastic reduction in the amount of oil used, could it be hoped to continue the use of this fuel.

The bulletin also carries a table of comparative tonnage and fuel performance figures for Southwestern carriers, indicating that the Texas & Pacific occupies fourth place. The goal of the 1927 fuel campaign was not attained although unit fuel consumption was decreased as compared with the previous year in all services except switching. The objective set for 1928 was "a minimum saving of 10 per cent over 1927 and such additional saving in freight service as may be necessary to lead the Southwest."

## Panama Canal Traffic Breaks Record

WASHINGTON, D. C.

TRAFFIC through the Panama canal in the fiscal year ended June 30, 1928, was greater than in any preceding year, according to the annual report of the governor of the canal just submitted to the Secretary of War. The 1928 traffic exceeded that of 1927 by 18 per cent in the number of commercial transits, 12 per cent in net tonnage, 11 per cent in tolls and 7 per cent in cargo carried. The growth in traffic has led to an extension during the past year of the hours of operation and to increase in various elements of business connected with the operation of the canal.

Increasing business, the report says, has led to consideration of an enlargement of the capacity of the canal and also of a reduction of the tolls but on this point the governor, M. L. Walker, remarks that such a step might cripple the railroads in competition with intercoastal lines while reducing the government's revenue.

Combined net revenue of the canal and the Panama Railroad business operations was \$20,621,314, the maximum yearly net revenue to date, and the report shows that this is in excess of what an interest charge might amount to, if interest were taken into account, on the \$275,000,000 which has been arbitrarily adopted as representing the investment in the canal in a commercial sense, as distinguished from that charged off as expenditure for national defense. It also points out that the operating earnings aggregated to date for the 14-year period of canal operation leave a deficit as compared with 3 per cent interest on \$275,000,000.

The net tonnage of the 6,456 commercial transits in 1928 was 29,458,634 tons, Panama Canal measurement. Tolls levied amounted to \$26,944,499, and cargo carried through the canal aggregated 29,630,709 tons of which 10,067,393 were carried on United States intercoastal routes. This was a slight decrease as compared with the preceding year caused principally by light shipments of mineral oils during the last six months of the year.

Total cargo passing through the canal from the Atlantic to the Pacific during the year shows a decrease of 273,193 tons as compared with the fiscal year 1927. Of the 13 commodities shown as having a total of 100,000 tons or more through the canal during the year, manufactures of iron and steel, cotton, and tin plate show decreases as compared with 1927. Totals for the other 10 were as great or greater than during the preceding fiscal year.

The Pacific-to-Atlantic cargo movement during 1928 was larger than during the year preceding by 2,155,687 tons. Since shipments of mineral oils in this direction through the canal declined as compared with the year preceding approximately one and one-half million tons, this means an increase in other commodities of over 3,600,000 tons. Most of the major commodities through the canal from the Pacific to the Atlantic during the year show substantial increases, shipments of nitrates and wheat being more than double those during the year preceding.

In the Atlantic-to-Pacific traffic approximately 66 per cent of the total cargo through the canal during the year originated on the east coast of North America and about 43.5 per cent was destined to the west coast of North America. In the Pacific-to-Atlantic traffic the percentages are a little greater, as about 66 per cent of the total cargo originated on the west coast of North Amer-



ica and approximately 56 per cent was destined to the east coast.

Notwithstanding a decrease of some one and one-half million tons of mineral oils from the southern California fields, the volume of cargo movement between the principal trade areas served by the canal was as great or greater than during the preceding fiscal year. Two outstanding features of the cargo movement during the year are a decrease in United States intercostal cargo of some 500,000 tons, due to the decline in mineral oil shipments and the heavy increase in nitrate shipments from the west coast of South America, which were more than double those during the preceding year. Shipments to and from the west coast of South America increased over the preceding year by nearly one and one-half million tons.

In a general summary the report says:

Present traffic is considered to be between 45 and 50 per cent of that which the canal can handle, as constructed at present, the first move to provide for future increases and to assure sufficient depth of water in the cut and over the upper sills of the locks has been begun in the development of a supplementary water supply. A résumé of the essentials of this project is presented in a section devoted to additional storage at Alhajuela. It is believed that this, with the eventual construction of a third flight of locks, paralleling the present twin flights will increase the present capacity of the canal by about 70 per cent.

The total net revenue from combined Panama canal and Panama Railroad operations in the fiscal year was \$20,621,314.82, the best showing for any year to date. The increasing revenues have been made the occasion for proposals that the tolls be reduced, either on all traffic or on special classes of vessels. Policy in this respect is for determination by Congress. It is pertinent, however, for the administration of the canal to point out that heavy expenditures are yet due to be made for additions and replacements in the plant, for the adequate quartering of employees, for suitable retirement of employees grown old or disabled in this exacting service: that tolls at Panama are lower (by approximately a third at present) than the tolls at Suez; that reductions will benefit foreign vessels in foreign trade as well as United States vessels in domestic trade; that the intercostal lines are competing severely with the railroads, and a lowering of tolls may cripple the internal transportation system of the United States while reducing the government's revenue, with offsetting benefits accruing only to limited special interests.

The net income from tolls and other miscellaneous receipts known as "transit revenues" was \$18,224,844.86 for the fiscal year 1928, as compared with \$15,611,093.80 in 1927, \$15,151,668.06 in 1926, \$13,465,924.72 in 1925, and \$16,307,948.50 in 1924.

The net profits on auxiliary business operations conducted directly by the Panama canal, of which the most important are

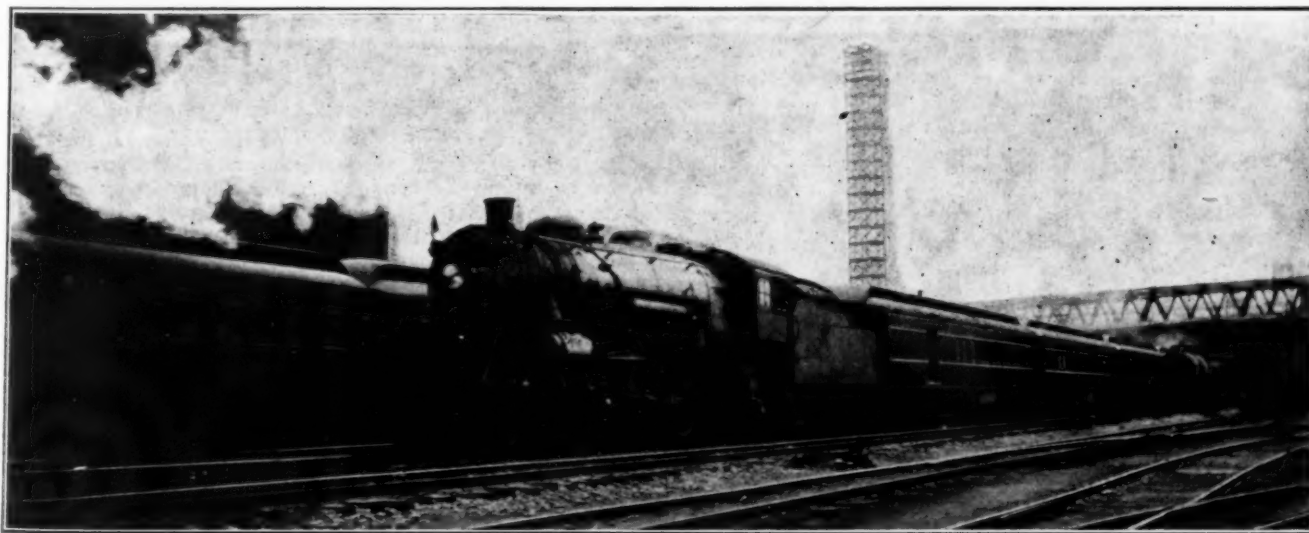
the mechanical shops, material storehouses, and fuel-oil plants, totaled \$736,719.43, as compared with \$876,536.80 in 1927, \$841,310.29 in 1926, \$765,916.85 in 1925, and \$901,624.12 in 1924. The net profits of operations conducted by the Panama Railroad Co., exclusive of the Panama Railroad Steamship Line but including commissaries, docks, coaling plants, and cattle industry, were \$1,659,750.53, as compared with \$1,644,189.37 in 1927, \$1,347,887.33 in 1926, \$1,525,910.13 in 1925, and \$1,044,887.04 in 1924. The total net revenue of the year from all sources, exclusive of the Panama Railroad Steamship Line, was \$20,621,314.82, as compared with \$18,131,819.97 in 1927, \$17,340,865.68 in 1926, \$15,757,751.70 for 1925, and \$18,254,459.66 in 1924.

The canal, opened to traffic on August 15, 1914, was blocked by slides at various times during the first few years, and with the relatively light traffic of the first nine years did not return a net revenue commensurate with its cost. Beginning with the fiscal year 1923 there was a distinct advance; the combined net revenue of the canal and Panama Railroad for that year was \$12,063,880.74, as compared with \$3,079,531.91 during the preceding year. The following year 1924, showed a further increase of something over \$6,000,000 to be followed in 1925 with a decrease of approximately two and one-half millions as compared with 1924 figures. Since 1925 the net revenue for each year has been higher than for the year preceding, and the figure of \$20,621,314.82 for the fiscal year 1928 represents the maximum yearly net revenue to date.

Investment in the canal is partly commercial, partly for national defense. Arbitrarily the figure of \$275,000,000 has been adopted as representing the investment in a commercial sense (exclusive of the Panama Railroad Co.) and approximately \$115,000,000, including the \$40,000,000 paid to the French, has been charged off as expenditure for national defense. The annual interest on \$275,000,000 at 3 per cent, the rate on most of the Panama Canal bonds, would be \$8,250,000; at 4 per cent it would be \$11,000,000 at 5 per cent, \$13,750,000. However, no interest charge is taken into account, although there is a fixed annual charge of \$350,000 for amortization of canal fixed property having a life of 100 years and \$640,000 covering depreciation at 2 per cent per annum on property having a life of less than 100 years, which together with interest at 3 per cent per year will provide for amortization of the investment or replacement of all items at the end of 100 years. In addition, the expenses include a further charge of approximately \$750,000 per year for depreciation of canal equipment and plants. To June 30, 1928, the operating expenses for the canal proper amounted to approximately \$104,000,000 and the revenues to over \$196,000,000, of which \$193,018,936.71 was for tolls alone. In addition, the operating expenses of certain auxiliary business units amounted to over \$159,500,000 more, against business revenues of \$166,000,000. The excess of total earnings over total expenses at the beginning of the fiscal year 1929 stood as \$98,915,439.82.

In the above, as stated previously, there is no consideration of interest charge on the investment. At 3 per cent on \$275,000,000 it would have amounted to \$115,500,000 for the 14-year period of canal operation at simple interest and if compounded would be considerably more. Against this the operating earnings, aggregated to date, leave a deficit.

\* \* \* \*



New York Central's "Twentieth Century Limited" Leaving Chicago

## Communications and Books

### Long Timbers from the Northwest

SEATTLE, WASH.

TO THE EDITOR:

On page 429 of the September 1 issue of the *Railway Age*, there appeared an item under the heading:

"Timber 102 ft. Long Shipped Across Country"

While these are long sticks, they do not approach, in size, some others which have, at various times, been shipped out of the Pacific Northwest. Below are memoranda of some large dimension and long length timbers manufactured and shipped by the Ostrander Railway & Timber Company from Ostrander, Wash., which is located on the Northern Pacific, 3.6 miles north of Kelso, Wash.

A triple load on CB&Q 90969, NYC 47973 and Erie 9622 cars, shipped from Ostrander on July 30, 1925, destined to Clarendon, Ark., and routed via the Northern Pacific, the Chicago, Burlington & Quincy and the Missouri Pacific contained:

4 pieces.....	6 in. x 14 in.—120 ft.
2 pieces.....	6 in. x 14 in.—118 ft.
2 pieces.....	6 in. x 16 in.—116 ft.
2 pieces.....	8 in. x 16 in.—114 ft.

and some shorter stock.

Another triple load on C&NW 41615, NP 69611 and CB&Q 90965 cars, shipped from Ostrander on October 31, 1925, destined to Paducah, Ky., and routed via the Northern Pacific, the Minneapolis & St. Louis and the Illinois Central carried:

2 pieces.....	8 in. x 16 in.—125 ft.
4 pieces.....	6 in. x 14 in.—125 ft.
4 pieces.....	6 in. x 14 in.—124 ft.
2 pieces.....	8 in. x 16 in.—122 ft.
8 pieces.....	6 in. x 16 in.—122 ft.
2 pieces.....	8 in. x 18 in.—118 ft.
4 pieces.....	7 in. x 18 in.—118 ft.
8 pieces.....	8 in. x 16 in.—110 ft.
2 pieces.....	7 in. x 16 in.—110 ft.
2 pieces.....	7 in. x 14 in.—110 ft.
2 pieces.....	7 in. x 12 in.—110 ft.

Still another triple load on StL-SF 94534, Erie 8961 and Penn 425700 cars, shipped from Ostrander on April 1, 1926, consigned to Sistersville, W. Va. and routed via the Northern Pacific, the Chicago & North Western and the Baltimore & Ohio carried:

2 pieces.....	16 in. x 18 in.—120 ft.
6 pieces.....	7 in. x 18 in.—100 ft.
2 pieces.....	6 in. x 18 in.—100 ft.

and some shorter stock.

The Ostrander Railway & Timber Company at one time shipped some timbers measuring 48 in. x 48 in. x 80 ft. in length. It furnished to the Alaska-Yukon-Pacific exposition at Seattle, in 1909, a timber 18 in. x 18 in. x 156 ft. long, surfaced four sides; at another time, it supplied a ship builder with a keel timber measuring 16 in. x 24 in. x 156½ ft. long, surfaced four sides to the net dimensions given.

The longest sawed timber ever turned out by this mill was a stick 217 ft. in length, measuring 26 in. x 26 in. at one end, and 8 in. x 8 in. at the other end. This timber was intended for exhibit at the Lewis & Clark exposition at Portland in 1905, but was broken in handling and was placed alongside the station platform at Ostrander, where it still remains.

PAUL MCKAY,

Assistant Purchasing Agent, Northern Pacific.

### Railway Lumber Buying

NEW YORK.

TO THE EDITOR:

My attention has been called to the editorial on page 355 of your August 25 issue entitled "Co-operation with Trade Associations."

It would appear from the editorial that the handling by one lumber institution of the various sizes and grades required to make up a single order is a new departure. The article overlooks the fact that many lumber wholesalers of the country have made a specialty of catering to railroad busi-

ness, and it is because of their special knowledge of the class of stock needed by the carriers, as well as their knowledge of sources from which this stock can be obtained that such a large percentage of railroad lumber purchases have been handled by wholesalers.

Railroad car material is essentially the wholesalers' business—no one mill could possibly produce all the lumber in the average large order for car construction material. Many times a single mill could not have shared in the business at all, because it could only furnish a part of the order, whereas the wholesaler, with other mills at his command, can allocate his orders so as to assemble a varied stock to meet the complex requirements.

Furthermore, in the settlement of disputes on lumber grades the railroad buyer has to deal with only one factor,—the lumber wholesaler—leaving it for the latter to make all necessary adjustments with the mills from which the stocks have been accumulated.

In the writer's opinion there is a serious question regarding the desirability of a trade association engaging in the actual selling of lumber, such as would be the effect of pool selling or the allocation of orders. Such an activity would hardly come within the recognized definition of a trade association. However, if an association converts itself into a lumber sales agency, it is simply engaging in the wholesale lumber business and doing no more than performing a function which has been assumed so successfully by lumber wholesalers over a long period of years.

I simply wish to call your attention to what has been the customary and satisfactory practice on the part of many railroads, and that, through reliable wholesalers of established reputation, there has always existed and still exists, to a very marked degree, distributing factors which serve the railroads in the manner which might be inferred from your editorial as something of recent origin.

W. W. SCHUPNER,

Secretary National-American Wholesale Lumber Ass'n., Inc.

### New Books

*The Movement of Railway Equipment Through Curves*, by J. Jahn, professor in the technical high school of Danzig Free State. 152 pages, illustrated, 5½ in. by 8 in. Published by der Verkehrswissenschaftlichen, Lehrmittelgesellschaft M. B. H. bei der Deutschen Reichsbahn, Berlin W 8. Germany.

This is an ingenious mathematical study of the mechanics of the movement of wheeled vehicles around curves. The treatment is rigid and is based on a careful analysis of the positions which the various trucks and groups of wheels take during the movement of the car or locomotive on the curve. Practically all of the usual wheel arrangements employed in locomotives and cars are considered, including swiveling trucks, axles with lateral play, etc. The author contends that his method offers an effective guide for the design of equipment with a view to obtaining the minimum frictional resistance between rails and wheel flanges. Being published only in German, the book has limited application in this country but should prove of value to the student of curve mechanics, particularly in connection with the analysis of the results of tests.

*Standards and Standardization*, by Norman F. Harriman. 225 pages, illustrated. 6 in. by 9½ in. bound in cloth. Published by McGraw-Hill Book Company, Inc., 370 Seventh Avenue, New York. Price \$3.

Mr. Harriman's book is one of a series on industrial management, being prepared under the editorship of D. N. Kimball, dean of the College of Engineering, Cornell University. Its purpose is to present a concise account of the more important



elements of standardization in connection with industry. It is the first book in English specifically on the subject of standards and standardization. The author is a senior engineer-physicist in the United States Bureau of Standards, vice-chairman of the Federal Specifications Board, and a member of the Federal Purchasing Board of the Bureau of Budget of the United States Government, and was formerly engineer of tests of the Union Pacific. He has approached the subject of standards and standardization scientifically, and presents a valuable historical and theoretical discussion on both standards and specifications. Its value to the technical man lies chiefly in the specific descriptions given of national standards of measurement, and in his forms on specification writing. Descriptions are also given of the various standardizing bodies in existence at the present time. Samuel M. Vauclain, president of the Baldwin Locomotive Works, in an introductory paragraph to the book, has termed it a practical treatise on an increasingly important subject in modern industry.

## Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,  
Bureau of Railway Economics, Washington, D. C.)

### Books and Pamphlets

*New North Station, Boston.* Sketch of the construction progress and principal features. Illustrated. 14 p. Pub. by Boston & Maine Railroad, Mass. *Apply.*

*An Outline of Careers for Women*, edited by Doris E. Fleischman. Includes discussion of railroading as a career for women by Margaret Talbott Stevens, Associate Editor, Baltimore and Ohio Magazine. Pub. by Doubleday, Doran & Co., Garden City, New York. \$3.00.

*Serial Report, Electrification of Steam Railroads Committee 1927-1928.* Table I, "Condensed Analysis of Installations of Electrical Operation on Steam Railroad Lines," shows the earliest to have been the 1893 electrification, Stockholm-Djurs-holm, of the Stockholm Roslagens Railway. Data for 27 countries given. Publication No. 278-103. 35 p. Pub. by National Electric Light Association, New York City. 55 cents.

*Co-operative Marketing.* Report by Federal Trade Commission. Covers development and importance of movement, organization and operation of co-operatives, and results in marketing of milk and milk products, grain, fruit, livestock, wool, poultry and eggs, cotton, tobacco, rice, nuts, vegetables, and other commodities. 70th Cong., 1st sess. S. Doc. 95. 721 p. Pub. by U. S. Govt. Print. Off., Washington, D. C. 75 cents.

*Rama VI Bridge*, by Luang Prakob Yantrakich, Resident Engineer in Charge. This bridge connects the Northern and Southern systems of the Siamese State Railways and is cantilever type, 5 spans, 442.08 meters long. Published as Nos. 1 and 4 of "Technical and Scientific Supplements to the Record" issued by the Ministry of Commerce and Communications to make known Siamese research and achievements and so avoid duplication of research and effort. 2 vols. Pub. by Ministry of Commerce and Communications, Bangkok, Siam.

### Periodical Articles

*Her Railroad Nights*, by Lillian ("Jim") McCahan. "A woman telegrapher describes her job. Personality, November, 1928, p. 16-22.

*The Transportation Strength of China In Its Bearings on the Standard of Living and the Struggle to Achieve Order*, by John Earl Baker. Coolies, railroads, rivers, and their relations. Illustrated. Map. Asia, November 1928, p. 906-912, 930-935.

*New Air Communication for Western Hemisphere*, by Louise Funston Shields. "The schedule announced by the Slate Aircraft Corporation provides passenger service from Los Angeles to New York in 36 hours, with stops at principal cities en route, and a non-stop fruit and vegetable express in 28 hours." p. 1115. Bulletin of the Pan American Union, November 1928, p. 1115-1117.

## Looking Backward

### Fifty Years Ago

A Texas court of appeals has just affirmed the constitutionality of a state law which requires the conductor of every passenger station to stop his train at every wayside station for not less than five minutes.—*Railway Age*, November 14, 1878.

In his annual report, the second assistant postmaster General condemns the present system of paying railroads by weight of mail carried and recommends that space, speed and frequency be made the basis of compensation. The report shows that the total cost of railroad mail transportation in the past fiscal year was \$9,566,565, which is an average rate of about \$123 per mile of road.—*Railroad Gazette*, November 15, 1878.

The Northern Pacific is receiving bids until December 17 for the extension of its line westward from the west bank of the Missouri river, opposite the present terminus at Bismarck, Dakota, to the Yellowstone river, at or near the mouth of Glendive creek, about 200 miles.—*Railroad Gazette*, November 15, 1878.

### Twenty-five Years Ago

Percy R. Todd, second vice-president of the New York, New Haven & Hartford, has been elected first vice-president.—*Railway Age*, November 20, 1903.

Track-laying has been completed on the Ogden-Lucin cut-off of the Southern Pacific from Ogden, Utah, across Great Salt Lake, to Lucin, 103 miles, and a formal inspection trip will be made by E. H. Harriman, president, on November 20.—*Railway Age*, November 20, 1903.

The Mexican Chamber of Deputies, on November 11, passed a bill authorizing the consolidation of the National of Mexico Company, with 1,950 miles of lines, the Mexican International, with 880 miles, and the Interoceanic, with 736 miles.—*Railway Age*, November 20, 1903.

James J. Hill, president of the Great Northern, in an address before the North Dakota irrigation congress at Bismarck on October 20 stated, as an indication of the material growth of the Northwest, that his railroad's traffic has grown 1,600 per cent in 21 years from 1,000,000 tons in 1882 to 16,148,000 in 1903. In 1892 the tons hauled one mile aggregated 997,000,000 and in 1903, 3,606,000,000 or an increase of 400 per cent in 10 years. Since 1882 the rate for carrying a ton of freight 100 miles has dropped from \$2.51 to \$1.21 in 1892 and 85 cents in 1903.—*Railway and Engineering Review*, November 14, 1903.

### Ten Years Ago

The first effect on the railroads of the signing of the armistice on November 11 and the cessation of hostilities, will be felt in some reduction in the demands on railway facilities for the movement of men and supplies. The priorities division will permit industries to increase their operations to normal limits. The Railroad Administration will not effect immediate reductions in freight and passenger rates although the extra fare of one-half cent for Pullman passengers may be eliminated. Arrangements have been made to care for the usual winter travel to California and Florida.—*Railway Age*, November 15, 1918.

There is a strong tendency in Congress toward the return of the railroads to private management and a movement in that direction will doubtless be started at once if there is an extra session in the Spring and the new Republican Congress takes the floor. This will take the form of the introduction of bills to repeal the federal control act. Senator Cummins of Iowa and Representative Esch of Wisconsin will head the interstate commerce committees of the two houses under the new line-up and both of them have serious objections to some of the things done by the Railroad Administration.—*Railway Age*, November 15, 1918.

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# Odds and Ends of Railroading

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## Purely Historical

In July, 1854, the book of rules of the Virginia & Tennessee contained the following:

"Rule 12. Conductors and other trainmen must not attempt to influence passengers in favor of or against certain saloons, but must act impartially in this respect."

## Can Anybody Beat This?

Antonio Farina, blacksmith in the locomotive shop of the Reading at Reading, Pa., claims a unique distinction among railway men in that he is the only father of triplets. The youngsters are all boys and have now reached the age of four in perfect health.

## A Whale

J. F. Hauck, blacksmith helper of the Pennsylvania at Columbus, Ohio, seems to have cinched the railway plunge-for-distance championship when he created a record of 70 ft. 2 in. at a swimming meet. Hauck, who it is reported weighs 318½ lb. when in the pink of condition, is prepared to meet all comers in this event.

## A Heavy Drinker

C. C. Doscher, yard clerk for the Pennsylvania at Pittsburgh, Pa., claims to be the lemonade-drinking champion of the railways. In a recent contest, Doscher drank 16 consecutive eight-ounce cups of lemonade in 15 min. Another competitor, A. L. Reiter, brakeman, made an excellent showing, but bogged down on the fifteenth cup, and gracefully conceded the championship to Doscher.

## Dirigible versus Train

An unexpected and impromptu race was staged recently between the navy dirigible "Los Angeles" and a Baltimore & Ohio passenger train, while the blimp was enroute from San Antonio, Tex., to Lakehurst, N. J. Entirely by accident, the airship and the train left Akron, Ohio, at identically the same time. The dirigible followed the train into Pittsburgh, Pa., arriving there just four minutes behind it.

## Remember Abner Dalrymple?

In the excitement occasioned by the world's series, and "Babe" Ruth's home runs, a passenger conductor retired from active service on the Northern Pacific, practically unnoticed. Yet that conductor was Abner Dalrymple, who, from 1879 to 1886, was one of the leading sluggers of the major leagues, while playing left field for "Pop" Anson's Chicago White Stockings. Another famous member of the same team was "Billy" Sunday, the prominent evangelist.

## A Hold-Up with Reverse English

T. M. Ward, engineer, and A. K. Lewis, fireman, of a Missouri-Kansas-Texas train, suspected a holdup when a man climbed over the tender and into the engine cab as the train was running from Parsons, Kan., to Erie. They were sure of it when, instead of answering their question as to what he wanted, the visitor produced a gun. They were shocked when he handed the revolver to them without a word. Turned over to police, Frank McCauley, the visitor, pleaded guilty to drunkenness and was sentenced to 30 days in jail.

## The Dinken Family

Down around Boyles, Ala., on the Louisville & Nashville, everyone knows the Dinkens. T. M. Dinken, Sr., is yardmaster there. H. P. Dinken, T. M. Dinken, Jr., F. L. Dinken and W. J. Dinken, his sons, are all yardforemen, while H. J.

Dinken and L. S. Dinken, twin sons, are switchmen at Boyles. B. M. Dinken is the only one of the seven sons who is not in yard service, and he is a fireman. The only Dinken daughter carried out the family tradition when she married Robert D. Bearden, a boilermaker, also employed by the Louisville & Nashville. The senior Dinken claims that if, as yardmaster, his yard force gets to "acting up", he is still quite capable of becoming "Pa" Dinken of their childhood and switching the switchmen.

## Railway Megaphonists

The conductor on the Manitou & Pike's Peak "doubles in brass", to use the theatrical term. In addition to collecting tickets, he presides at the megaphone as the train winds its way from the little town of Manitou, Colo., to the summit of Pike's Peak, 14,109 ft. above sea level. On the Canadian National some of the news vendors perform a like service while traversing the mountains. One of the most interesting of these railway megaphonists is the colored porter on the boat-train operated by the Southern Railway from Richmond, Va., to West Point, where it makes connections with the Chesapeake Bay boats. The country traversed is among the most historical sections and the porter knows, or says he knows, at just which houses George Washington or Thomas Jefferson stopped, where Cornwallis' army forded rivers and other information of a like nature.

## The Mystery of Room 1

From the time the union station at New Orleans, La., was built, in 1892, R. S. Charles, assistant local treasurer, Illinois Central, had his office in Room No. 1. Mr. Charles died a year ago, and the office was closed and the position of assistant local treasurer abolished. A month or two ago it was decided to use Room 1 for the installation of a telephone exchange. The ancient vault was opened, so that its contents might be properly assorted. When the door swung open, package after package of paper money fell out and scattered on the floor. When the money had been counted, there was found to be more than \$100,000 in bills of various denominations. This money was lost sight of for years and its source can now only be conjectured. The Illinois Central, although still in possession of this large amount of currency, is no better off than before it was discovered. The money, having been issued by the Confederate government, is worthless, except as a memento of Civil War days.

## How Long Is a Mile?

One of the well-authenticated yarns that comes down to us from the days of wholesale railway construction deals with the foreman who estimated that his gang should be able to lay one mile of track per day. He forthwith made an agreement with the Italian gang boss, that as soon as one mile was completed any day, the gang could quit. Things went along smoothly for a while and the men would finish ahead of time on most days. Then came the orders to finish the track-laying to a point we shall call Ashby before the following Sunday. The foreman was somewhat at a loss, since Ashby was five miles away and four days only remained until Sunday. But he was resourceful, and, that same night, he and a few cronies dug up the intervening mileposts and reset them in such a way that, according to the newly arranged mileposts, Ashby was only four miles away instead of five. Of course the gang was obliged to put in considerable overtime, but they finished before Saturday night. When the gang boss complained that the miles seemed unusually long, the foreman admitted that they were longer in that locality, because of the climate, and he got away with it.

N. G. NEAR.



# NEWS of the WEEK



Maine Central, No. 29, Leaving Portland, Me.

JOHN F. GILCHRIST, chairman of the Metropolitan division of the New York State Public Service Commission (jurisdiction over New York City) has resigned.

THE PROTECTIVE SECTION of the American Railway Association announces that its annual meeting next year will be held at the Atlanta-Biltmore Hotel, Atlanta, Ga., on April 16, 17 and 18.

THE NOVEMBER MEETING OF THE WESTERN RAILWAY CLUB, to be held Monday evening, November 26 at the Hotel Sherman, Chicago, will be addressed by W. A. Austin, consulting engineer, Baldwin Locomotive Works, who will present the subject, "The Caprotti Poppet Valve Gear."

ON A TEXAS & PACIFIC TRAIN enroute from Big Spring, Tex., to St. Louis, Mo., on November 9, the mail car was robbed of \$50,000, when a bandit boarded the train at Ft. Worth and forced two mail clerks into submission. The money was later found under a viaduct near the place where the robbery occurred.

THE CINCINNATI RAILWAY CLUB will hold its next meeting at the Chamber of Commerce on Monday evening, November 19. The subject of discussion will be Cincinnati's new terminal; speakers, H. M. Waite and Frank Strouse. This meeting is set for six p. m., it being the annual dinner and election of officers. The Red Arrow Quartette of the Pennsylvania Railroad will entertain the diners.

HENRY NAUMANN of Hammond, Ind., has received from the United States Government, a bronze medal of honor, awarded by President Coolidge on the recommendation of the Interstate Commerce Commission (in accordance with the law of February 23, 1905) in recognition of his bravery in attempting to save the life of a woman at a crossing in Hammond on March 30, 1927. The awarding of two medals to Mr. Naumann by the Carnegie Hero Fund Commission, one of them in recognition of a similar act of bravery in 1924, was noticed in the *Railway Age* of November 3, page 882. Mr. Naumann was a flagman at the

crossing of the Michigan Central at Hohman street, Hammond. The woman attempted to cross the tracks after the gates had been lowered and when west-bound passenger train No. 15 was approaching, very near, at about 10 or 15 miles an hour. The woman was killed and Naumann lost one leg.

## N.E.R.R. President's Committee

The New England Railroad Presidents' Committee has been formed by the principal railroads operating in New England with a view to facilitating conference and co-operation with the New England Council, of which John H. Lawrence is the president. The roads participating are the Canadian National, Canadian Pacific, Boston & Maine, Boston and Albany, New York Central, Bangor & Aroostook, Maine Central and New York, New Haven & Hartford. George Hanauer, president of the Boston & Maine, is chairman of the new committee.

## C. N. R. Branch Lines

A total of 390.6 miles of track was laid during the present season on Canadian National Railways branch lines in Western Canada, and tracklaying work is being rushed on all lines between now and freeze-up, it was stated by H. A. Dixon, chief engineer, Western Region, Canadian National. Of this mileage, 168.1 miles were in Manitoba and included work on the Flin Flon branch and the Hudson Bay extension to Fort Churchill. In Saskatchewan a total of 158.2 miles of steel were laid on nine branch lines. In Alberta, with three branch lines under construction this year, 63.4 miles of line were laid.

## The C. P. R. in September

Operating net of the Canadian Pacific for the month of September showed an increase of \$1,804,192 over the corresponding month of last year, standing at \$6,298,203, against \$4,494,011 in September, 1927. Gross earnings were higher by \$4,138,115, while operating expenses were higher by \$2,513,922. Net earnings for the month under review were the second highest for any September on record, having only been exceeded in September, 1926.

For the nine-month period ended with September net was \$6,730,043 above that shown in the corresponding period of last year, standing at \$31,225,289, which was the highest level for any nine-month period since 1917. Gross earnings for the nine-month period showed an increase of \$17,385,163 over the same period of 1927, while operating expenses were higher by \$10,655,119.

## New York Railroad Club Annual Dinner

The Fifty-Sixth Annual Dinner of the New York Railroad Club will be held Thursday, December 13, in the grand ballroom of the Hotel Commodore, New York. The principal address of the evening will be given by C. M. Keys, president of the Transcontinental Air Transport, Inc., also president of the Curtiss Aeroplane & Motor Co., Inc., on the subject: "What the Air-Rail Business Means." Commander Charles E. Rosendahl, of the U. S. Navy Dirigible Los Angeles, also will address the gathering. Eliot Sumner, president of the club will act as toastmaster. Other special features of entertainment will be given. The meeting will begin at 6:15 o'clock with a reception held in the ballroom. The following members head committees in charge of the arrangements: T. R. Langan, general chairman; Roswell P. Cooley, vice-general chairman; H. B. Gardner, Arthur N. Dugan, W. J. Hedley, H. M. Norris, G. Flatow.

## Pennsylvania Safety Meeting

Supervisory forces of the New York zone of the Pennsylvania met at Pennsylvania Station, New York, on November 9 in a safety meeting designed to inaugurate a movement for the improvement of the employee safety record in their territory. The meeting was held in two sections, one-half of the zone's supervisory force attended a forenoon session while the other half assembled in the evening.

The forenoon session was addressed by R. C. Morse, general superintendent, New York zone, who also presided, F. R. Gerard, superintendent of the Long Island, and Thomas H. Carrow, superintendent

of safety, Pennsylvania System. A series of basic principles in accident prevention were presented and discussed while a number of the supervisors present were called upon to comment on these recommendations. The principal speakers at the evening session were G. LeBoutellier, vice-president of the Pennsylvania, and the Long Island, and J. F. Patterson, general manager, New York zone.

December Safety Program

"There can be no more complete earthly happiness than that which shines in the eyes of little children as they stand on Christmas morning waiting for the door to open to reveal those gifts which Santa Claus has placed upon their tree." This is the introductory paragraph of the program for railroad safety committees during the month of December as issued by L. G. Bentley, chairman of the Committee on Education. From this the leaflet goes on to tell of the joy of parents, and then the sadness of homes where the husband and father has suffered—perhaps been killed—in the railroad service; and following this the admonitions for the promotion of safe habits in the railroad service are addressed (a) to the executive, (b) to the supervisor and (c) to the individual. The special classes of accidents mentioned are those under the heads of "Struck or Run Over," "Falls of Persons" and "Coupling or Uncoupling."

October Locomotive Shipments

October shipments of railroad locomotives, from principal manufacturing plants, based on reports received by the Department of Commerce, totaled 36 locomotives, as compared with 41 in September and 112 in October, 1927. The following table gives the shipments and unfilled orders of locomotives for October 1927 and 1928, the 1927 totals, and the totals for the first ten months of the two years.

Year and Month	RAILROAD LOCOMOTIVES				
	Shipments		Unfilled orders, end of month		
	Total	Domestic	Foreign	Domestic	Foreign
		Steam	Electric	Steam	Electric
October 1928	36	26	...	10	...
October 1927	112	81	12	10	9
October 1927 (10 mos.)	471	311	87	71	2
October 1927 (10 mos.)	950	654	128	146	22
October 1927 (year)	1,074	726	148	171	29
1928	170	113	29	26	2
1927	182	97	45	32	8

Program for R. B. A. Meeting

The Railway Business Association will hold its annual meeting and dinner at the Hotel Commodore, New York, on November 21. In addition to the regular program which follows a short extemporaneous address will be delivered by Myron T. Herrick, American Ambassador to France.

10 A. M. SESSION

Reports of Treasurer (P. Harvey Middleton), General Executive Committee (W. E. Sharp), "The Telephone Companies' Budgets," by C. A. Heiss, comptroller, American Telephone & Telegraph Co.

Forum and Discussion on "The Railways' Financial Outlook," introduced by Frank W. Noxon, secretary, Railway Business Association. "Calendar Change, a Business Need," by F. W. Keough, personal representative of George Eastman.

Appointment of convention committees.

12:50 P. M.—LUNCHEON BUSINESS SESSION

Convention Committee Meetings. Reports of Convention Committees—Finance, Resolutions, Nominations. Election of officers.

7 P. M. DINNER

Chairman, Alva B. Johnson, president of the Association. "Business Men and the Railways," by Daniel Willard, president, Baltimore & Ohio. "Regulation by Congress or the Commission?" by Robert C. Fulbright, chairman, Legislative Committee, National Industrial Traffic League. "Washington the Business Man," by Albert Bushnell Hart, Professor-Emeritus of History, Harvard College.

New Methods of Shipment to be Discussed at A.S.M.E. Meeting

A special session of the annual meeting of the American Society of Mechanical Engineers will be held on Thursday afternoon, December 6, at the Engineering Societies' building, 29 West Thirty-ninth Street, New York. Six papers, treating from different angles the problem of shipping materials on skid platforms, will be presented at this session. Mechanical methods of handling, common in plants throughout the country, have recently entered the distribution field and the Department of Commerce has sponsored a movement to standardize equipment and provide interchangeability in use. R. L. Lockwood of the Department of Commerce will trace the development of shipping material on skid platforms, outline the possibilities for growth, and explain the importance of interchangeability in the equipment. J. V. Miller, assistant general storekeeper of the Chicago, Milwaukee, St. Paul & Pacific, will discuss the application of skid shipment to the stores department of a large railroad and the economies obtained. The other papers will deal with material handling in inland water way and ocean transportation; the economic aspect of the skid shipment from the standpoint of the user, and the part played by the manufacturer of trucks and skids in the adoption of interchangeable equipment.

Progress on Hudson Bay Line

The construction of the Hudson Bay Railway is now well ahead of schedule, and if conditions are favorable in the coming winter steel may reach Churchill some time in March next.

C. A. Dunning, Minister of Railways at Ottawa, in discussing the situation in regard to the road, said that construction conditions have improved considerably, as the line neared Churchill. All summer the work has been handicapped because of a lack of suitable ballast. It had been decided to build up a grade from the muskeg before laying steel. However, despite these conditions, the rails had been advanced to within 50 miles of the port, although the ballasting was still to be done. In the last few weeks, however, the construction gangs have discovered large beds of gravel along the final stretch

of road and a different mode of construction will be followed in the winter. The steel will be laid, as was done on the Flin Flon line, on the ground, and the gravel will be hauled from the pits and placed beneath the ties.

The fact that steel will reach Churchill in a few months raises the important question as to what is to be done there. Mr. Dunning has set in operation the legal machinery for expropriating all privately-owned land, and in a few weeks the Federal Government will be in complete ownership of the entire port area. A decision will then have to be reached as to how development will take place.

Mr. Dunning has consulted with Premier Bracken, of Manitoba, and has suggested that the Dominion Government should take all the land needed for federal and port services, and should then give the townsites to the province. Mr. Bracken could then control development as he pleased. Churchill could be made a model municipality, and property leased to citizens, and not sold, or the land could be sold by the province. So far Mr. Bracken has not reached a decision.

North Station, Boston, Opened

On November 14 at 8 p.m., President Coolidge in the White House closed an electric switch which lighted a monitor light in the waiting room of the Boston & Maine's new North Station at Boston, Mass., and signaled the formal opening of this structure to the public. At the station in Boston a banquet in celebration was in progress and the monitor light ignited by the President was the central decoration over the speakers' table.

The banquet was tendered by the railroad to state and municipal officers, prominent citizens of Northern New England and officers of connecting railways and a place of honor was occupied by the road's oldest commuters, oldest enginemen and oldest conductors. T. N. Perkins, chairman of the board of the company, served as toastmaster and speakers included the Governors of Massachusetts, Vermont, New Hampshire, Maine and Connecticut, the Mayor of Boston, John S. Lawrence, president of the New England Council, Homer Loring, former chairman of the Boston & Maine, and George Hannauer, president of the company.

Governor Fuller of Massachusetts spoke of the rejuvenation of the Boston & Maine under the leadership of Homer Loring, T. N. Perkins and George Hannauer as an example of the sort of treatment which should be of benefit to other New England industries. Governor Spaulding of New Hampshire spoke of the improvement in the relations of the railroad and the public. Governor Brewster of Maine, in speaking of the reported economic decadence of New England, stated that such reports were ill-founded and referred to the accession of Mr. Hannauer to the presidency of the road as follows: "Transportation experts do not leave a center like Chicago to come and take up their residence in an economic graveyard."

Governor Weeks of Vermont told how



much more the people of his state appreciated their railroads since, following the floods of a year ago, they were deprived of service for weeks. Mayor Nichols of Boston told what the municipality was doing to co-operate with the railroad in its station development. Mr. Lawrence emphasized the historical features of the site on which the station is located, mentioning Revolutionary War associations. Mr. Loring hailed the new station as a community achievement, brought about not alone by the railroad, but by the co-operation of the railroad and the local governmental authorities. President Hannauer ascribed the accomplishments of the road to team-work by all concerned.

The central or station and auditorium section of the new station is now virtually complete, and work is nearing completion on the new industrial building being erected on one side of the central structure. Final plans for the hotel which is planned to flank the station on the other side have not been announced. An article describing this development appeared in the *Railway Age* of August 25, page 337.

### New England Railroad History

A 14-page chronology of New England railroad history is one of the principal features of Bulletin No. 17, which has just been issued by the Railway and Locomotive Historical Society, Boston. This

historical sketch, in most cases giving a single line to each item, has been compiled by Warren Jacobs, who is a veteran employee of the New York, New Haven & Hartford and one of the leading members of the Railway and Locomotive Historical Society. The history begins with April 1, 1826, when work was begun on the Granite Railway, the first railroad in America; and continues to the end of 1926, when the new Union Station at Springfield, Mass., was completed. Following are samples showing the character of the work:

1838  
July 23—Stephen A. Chase appointed first superintendent of Eastern Railroad.  
Aug. 10—West Stockbridge Railroad opened.  
(Continued on page 988)

## Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from the Monthly Reports of Revenues and Expenses for 185 Steam Railways, Including 16 Switching and Terminal Companies.

FOR THE MONTH OF SEPTEMBER, 1928 AND 1927

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Average number of miles operated .....	240,691.56	239,437.60	59,360.90	59,385.21	5,632.53	5,623.37	40,160.96	39,808.93	135,537.17	134,620.09
Revenues:										
Freight .....	\$423,346,927	\$426,936,647	\$174,250,790	\$175,274,744	\$20,257,756	\$21,981,804	\$48,453,956	\$54,418,219	\$180,384,425	\$175,261,880
Passenger .....	880,098,421	886,318,864	43,431,809	46,254,947	1,501,490	1,712,573	8,827,953	9,910,435	26,337,169	28,440,909
Mail .....	9,016,316	7,653,643	3,530,264	2,891,939	211,103	196,408	1,267,667	1,121,357	4,007,282	3,443,939
Express .....	12,758,257	13,928,015	5,989,896	7,073,710	253,883	319,158	1,537,217	1,448,020	4,977,261	5,087,127
All other transportation .....	18,228,281	18,004,175	10,339,341	9,869,735	189,079	205,508	1,086,274	1,091,274	6,613,587	6,837,658
Incidental .....	11,780,474	11,894,766	5,618,460	5,765,175	294,560	351,628	965,815	1,100,851	4,901,639	4,677,112
Joint facility—Cr. ....	1,082,683	1,168,108	331,643	490,705	10,180	10,510	154,936	136,939	575,924	529,954
Joint facility—Dr. ....	267,339	435,675	25,910	136,058	12,927	2,032	33,566	35,244	194,936	262,341
Ry. operat'g revenues .....	556,044,020	565,468,543	243,466,293	247,484,897	22,705,124	24,775,557	62,270,252	69,191,851	227,602,351	224,016,238
Expenses:										
Maintenance of way and structures .....	74,838,582	76,788,693	31,727,209	33,021,856	2,916,837	3,421,881	9,497,666	9,911,651	30,696,870	30,433,305
Maintenance of equip'm't .....	95,697,728	99,858,709	44,641,381	47,251,608	4,329,662	4,636,865	12,128,822	13,214,029	34,597,863	34,756,207
Traffic .....	10,167,345	9,936,371	3,865,948	3,755,107	258,414	270,672	1,639,071	1,675,324	4,403,912	3,235,268
Transportation .....	175,642,590	180,786,340	80,863,170	83,890,430	5,508,808	6,184,396	21,249,728	22,951,040	68,020,884	67,760,474
Miscellaneous operat'ns .....	4,864,444	4,977,846	2,175,760	2,267,479	74,222	73,416	397,423	439,881	2,217,039	2,197,070
General .....	15,879,528	16,098,546	6,949,861	7,393,592	569,097	549,777	2,061,683	2,062,415	6,298,887	6,092,762
Transportation for investment—Cr. ....	1,443,731	1,839,355	272,062	333,752	27,966	70,717	62,125	78,740	1,081,578	1,356,146
Ry. operat'g expenses .....	375,646,486	386,607,150	169,951,267	177,246,320	13,629,074	15,066,290	46,912,268	50,175,600	145,153,877	144,118,940
Net revenue from railway operations .....	180,397,534	178,861,393	73,515,026	70,238,577	9,076,050	9,709,267	15,357,984	19,016,251	82,448,474	79,897,298
Railway tax accruals .....	35,547,206	35,357,188	15,253,569	14,749,719	1,534,534	1,926,965	4,480,985	4,693,282	14,278,118	13,987,222
Uncollectible ry. rev's .....	99,441	121,633	43,790	53,595	2,046	1,697	21,272	14,661	32,333	31,680
Ry. operating income .....	144,750,887	143,382,572	58,217,667	55,435,263	7,539,470	7,780,605	10,855,727	14,308,308	68,138,023	65,858,396
Equip't rents—Dr. bal. ....	3,170,661	8,223,551	3,390,771	3,118,812	465,248	457,155	423,647	52,845	5,668,793	5,623,649
Joint facility rent—Dr. balance .....	2,067,297	2,064,720	1,001,314	995,829	100,985	83,743	92,159	11,901	872,839	973,247
Net railway operating income .....	134,512,929	133,094,301	53,825,582	51,320,622	8,090,971	8,268,617	10,999,985	14,243,562	61,596,391	59,261,500
Ratio of expenses to revenues (per cent) .....	67.56	68.37	69.80	71.62	60.03	60.81	75.34	72.52	63.78	64.33

FOR NINE MONTHS ENDED WITH SEPTEMBER, 1928 AND 1927

Average number of miles operated .....	240,262.44	239,186.90	59,346.74	59,436.98	5,625.98	5,617.62	40,102.65	39,707.52	135,187.07	134,424.78
Revenues:										
Freight .....	3,415,019,689	3,476,684,100	1,470,337,840	1,529,957,337	169,041,691	189,136,881	442,993,475	473,335,175	1,332,646,683	1,284,254,707
Passenger .....	6,689,390,966	6,748,516,618	361,441,638	385,122,482	12,990,132	15,505,984	86,809,023	97,755,780	228,150,173	250,132,372
Mail .....	73,302,806	70,152,249	28,037,827	26,712,422	1,881,143	1,821,256	10,788,174	10,420,955	32,595,662	31,197,616
Express .....	101,669,377	102,627,479	46,679,098	48,421,935	2,204,730	2,339,397	12,956,203	13,251,866	39,829,346	38,614,281
All other transportation .....	154,913,402	156,072,573	87,612,117	87,330,654	1,735,252	1,885,592	9,047,842	9,640,190	56,518,191	57,216,137
Incidental .....	93,070,434	97,516,006	46,265,583	48,410,612	2,707,339	3,484,918	9,677,995	10,405,747	34,419,517	35,214,729
Joint facility—Cr. ....	9,993,652	10,407,897	3,816,027	4,192,336	112,426	134,071	1,332,926	1,480,697	4,732,273	4,600,793
Joint facility—Dr. ....	3,190,359	3,792,704	1,031,268	1,209,252	46,811	20,842	278,165	312,249	1,834,115	2,250,361
Ry. operat'g revenues .....	4,534,169,967	4,658,184,218	2,043,158,862	2,128,938,526	190,625,902	214,287,257	573,327,473	615,978,161	1,727,057,730	1,698,980,274
Expenses:										
Maintenance of way and structures .....	637,735,412	662,738,879	263,157,382	275,366,392	27,297,803	29,359,644	83,612,066	90,659,881	263,668,161	267,352,962
Maintenance of equip'm't .....	877,532,577	925,043,286	408,672,219	439,760,816	40,187,146	44,606,732	116,097,798	122,489,962	312,575,414	318,185,776
Traffic .....	93,963,248	90,519,178	34,932,405	33,524,187	2,415,805	2,382,322	15,642,295	15,636,475	40,972,743	38,976,194
Transportation .....	1,556,253,081	1,621,668,990	727,775,779	770,123,307	49,923,401	55,624,048	201,123,657	215,940,888	577,430,244	579,980,747
Miscellaneous operat'ns .....	42,260,748	42,591,815	19,483,461	19,608,668	723,214	754,212	4,499,013	4,671,267	17,555,060	17,557,648
General .....	144,850,625	144,386,671	64,562,765	65,685,499	5,414,033	5,076,320	18,836,963	18,867,650	56,036,864	54,757,202
Transportation for investment—Cr. ....	11,553,504	12,036,852	1,949,504	2,158,909	262,364	413,782	705,439	1,067,982	8,636,197	8,396,179
Ry. operat'g expenses .....	3,341,042,187	3,474,911,967	1,516,634,507	1,601,909,960	125,699,038	137,389,496	439,106,353	467,198,161	1,259,602,289	1,268,414,350
Net revenue from railway operations .....	1,193,127,780	1,183,272,251	526,524,355	527,028,566	64,926,864	76,897,761	134,221,120	148,780,000	467,455,441	430,565,924
Railway tax accruals .....	285,568,966	287,466,272	120,211,480	118,912,250	14,608,989	16,178,432	37,445,811	38,169,130	113,302,686	114,206,460
Uncollectible ry. rev's .....	958,944	1,107,225	475,374	441,619	15,551	41,138	154,980	176,506	313,039	447,962
Ry. operating income .....	906,599,870	894,698,754	405,837,501	407,674,697	50,332,324	60,678,191	96,620,329	110,434,364	353,839,716	315,911,502
Equip't rents—Dr. bal. ....	68,478,704	66,090,747	35,817,459	34,762,567	44,917,546	44,373,088	3,716,584	4,839,545	33,862,207	30,861,723
Joint facility rent—Dr. balance .....	18,266,286	18,649,044	9,244,245	9,058,414	964,922	886,321	658,675	876,410	7,398,444	7,827,899
Net railway operating income .....	819,854,880	809,958,963	360,775,797	363,853,716	54,254,948	64,164,958	92,245,070	104,718,409	312,579,065	277,221,880
Ratio of expenses to revenues (per cent) .....	73.69	74.60	74.23	75.24	65.94	64.11	76.59	75.85	72.93	74.66

<sup>a</sup> Includes \$3,848,668 sleeping and parlor car surcharge. <sup>b</sup> Includes \$3,728,815 sleeping and parlor car surcharge. <sup>c</sup> Includes \$30,472,161 sleeping and parlor car surcharge. <sup>d</sup> Deficit or other reverse items. <sup>e</sup> Includes \$30,706,201 sleeping and parlor car surcharge. Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

# Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1928

Name of road	Av. mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Net from operation	Operating income (or loss)	Net ry. operating income, 1927
		Freight	Passenger (inc. misc.)	Total	Maintenance of way and structures	Traffic	Trans- portation	General	Total				
Akron, Canton & Youngstown.....	Sept. 171	\$341,427	\$130	\$341,557	\$59,574	\$12,943	\$84,994	\$13,533	\$204,884	58.3	\$146,763	(\$13,119)	\$89,799
9 mos. 171		2,487,571	2,201	2,489,772	485,108	114,592	679,721	127,955	1,666,131	58.4	919,231	793,318	528,851
Atchison, Topeka & Santa Fe.....	Sept. 9,430	14,082,919	2,838,852	16,921,771	3,653,664	3,611,284	5,193,826	3,682,354	11,798,382	64.0	6,617,283	4,980,761	4,724,267
9 mos. 9,428		109,424,022	26,980,689	136,404,711	27,620,145	3,581,760	44,114,870	3,882,354	108,137,757	72.6	40,602,520	28,706,681	28,402,928
Gulf, Colorado & Santa Fe.....	Sept. 1,944	2,084,818	230,986	2,315,804	464,864	49,411	711,385	65,288	1,494,220	60.6	970,644	878,968	793,355
9 mos. 1,944		16,630,208	1,797,280	18,427,488	3,607,625	499,115	6,506,909	637,560	15,152,561	77.2	4,474,326	3,642,861	2,448,130
Panhandle & Santa Fe.....	Sept. 1,023	954,516	106,145	1,060,661	168,625	9,737	305,604	26,916	451,259	60.3	451,259	417,644	417,644
9 mos. 1,023		7,903,837	965,434	8,869,271	1,910,002	108,733	2,817,162	248,170	7,229,249	75.6	2,329,425	1,999,118	1,764,573
Atlanta & West Point.....	Sept. 93	164,432	54,644	219,076	27,080	12,844	90,451	12,925	190,532	74.9	63,738	49,878	33,694
9 mos. 93		1,465,445	521,371	1,986,816	264,753	112,492	822,609	118,520	1,761,826	77.7	506,417	371,904	231,448
Western of Alabama.....	Sept. 133	152,286	55,426	207,712	34,629	12,765	87,933	14,166	201,712	84.7	36,331	11,960	11,960
9 mos. 133		1,677,361	511,751	2,189,112	447,997	111,610	728,113	129,530	1,759,434	77.6	664,499	490,521	586,469
Atlanta, Birmingham & Coast.....	Sept. 639	300,013	31,708	331,721	87,460	29,275	141,538	19,239	365,836	98.2	6,675	-8,652	-14,203
9 mos. 639		2,873,620	260,563	3,134,183	795,614	263,085	1,423,818	19,239	3,478,449	95.7	119,832	119,832	119,832
Atlantic Coast Line.....	Sept. 5,127	3,266,316	778,627	4,044,943	4,552,397	937,895	1,901,596	156,230	4,365,506	95.9	188,891	-214,431	-4,080
9 mos. 5,113		38,386,513	10,570,604	48,957,117	8,471,275	1,588,657	19,219,060	1,581,300	42,672,603	79.8	10,808,699	6,592,615	6,668,116
Charleston & Western Carolina.....	Sept. 342	225,856	14,022	240,878	40,211	6,662	94,831	7,096	184,435	73.2	67,615	50,109	49,195
9 mos. 342		2,235,779	117,033	2,352,812	502,786	65,986	886,984	62,772	1,929,482	79.1	510,517	324,179	301,840
Baltimore & Ohio.....	Sept. 5,637	17,548,096	2,055,198	19,603,294	2,210,547	448,559	6,805,550	627,284	13,928,776	66.5	7,050,881	6,064,475	5,823,868
9 mos. 5,637		144,358,031	18,079,775	162,437,806	20,983,712	4,339,900	60,758,146	5,997,760	129,148,503	73.3	44,753,607	36,447,409	34,342,586
Baltimore & Ohio Chicago Term.....	Sept. 87	.....	.....	.....	38,673	41,729	161,520	15,000	266,842	68.9	120,195	50,535	168,668
9 mos. 87		.....	.....	.....	359,115	21,915	1,593,480	146,943	2,525,515	77.2	747,328	193,829	1,038,684
Staten Island Rapid Transit.....	Sept. 23	113,636	130,929	244,565	30,113	1,984	105,717	15,042	170,643	65.1	91,463	71,518	33,992
9 mos. 23		981,123	1,153,029	2,134,152	291,947	19,487	969,268	145,884	1,602,864	68.0	750,531	566,745	235,379
Bangor & Aroostook.....	Sept. 613	415,941	38,100	454,041	97,984	6,885	126,153	26,151	371,050	77.0	111,074	71,249	98,086
9 mos. 613		4,551,801	508,342	5,060,143	993,314	54,018	1,336,343	225,706	3,627,086	68.5	1,665,010	1,242,583	1,376,745
Belt Ry. Co. of Chicago.....	Sept. 32	.....	.....	.....	58,675	3,623	296,324	10,638	434,593	61.2	275,697	270,018	150,604
9 mos. 32		.....	.....	.....	573,404	34,261	2,746,872	103,795	4,076,999	67.7	1,946,651	1,480,752	1,300,793
Bessemer & Lake Erie.....	Sept. 224	1,781,717	9,538	1,791,255	106,899	13,387	363,232	34,529	827,461	45.7	984,502	854,678	862,161
9 mos. 225		11,491,149	90,763	11,581,912	1,020,408	129,975	2,784,932	307,013	7,045,798	59.9	4,709,108	4,042,693	4,030,019
Bingham & Garfield.....	Sept. 33	35,689	.....	35,689	8,606	1,374	8,811	4,308	29,747	80.7	7,125	18,075	13,832
9 mos. 33		342,195	.....	342,195	78,449	12,653	91,120	39,718	291,436	82.7	61,000	-5,171	147,001
Boston & Maine.....	Sept. 2,112	4,133,882	1,665,293	5,799,175	1,179,064	82,850	2,195,489	213,403	4,983,280	75.1	1,649,821	1,380,007	1,174,800
9 mos. 2,112		36,698,172	13,000,077	49,698,249	8,879,403	742,081	20,556,856	2,007,517	42,171,565	74.7	14,263,966	11,624,805	9,821,804
Brooklyn Eastern Dist. Terminal.....	Sept. 9	106,226	.....	106,226	4,392	10,910	41,783	6,577	68,945	62.5	41,295	33,546	33,546
9 mos. 9		1,051,849	.....	1,051,849	81,985	4,820	396,027	67,895	662,081	60.7	429,246	354,378	328,352
Buffalo & Susquehanna.....	Sept. 253	130,715	1,057	131,772	35,429	1,690	42,170	7,364	113,738	81.5	25,802	23,802	38,692
9 mos. 253		1,087,655	11,156	1,098,811	378,009	16,960	370,064	67,705	1,076,421	92.4	88,573	70,571	183,295
Buffalo, Rochester & Pittsburgh.....	Sept. 601	1,345,402	77,886	1,423,288	382,958	29,014	524,218	41,600	1,228,892	83.0	251,351	201,351	229,747
9 mos. 601		11,466,004	703,979	12,170,000	3,152,594	266,021	4,795,293	370,672	10,163,124	80.7	2,437,647	2,067,476	2,152,052
Canadian Pacific Lines in Maine.....	Sept. 233	88,552	25,133	113,685	62,841	6,699	68,688	4,105	173,556	137.2	-47,068	-61,068	-58,125
9 mos. 233		1,439,538	271,735	1,711,273	450,407	51,868	808,940	38,294	1,694,034	92.4	139,498	13,498	-165,623
Canadian Pacific Lines in Vermont.....	Sept. 85	116,926	41,376	158,302	29,937	1,954	92,281	1,829	152,271	83.5	30,071	35,221	-9,170
9 mos. 85		969,604	367,000	1,336,604	315,730	15,514	893,772	17,183	1,218,641	145.0	-689,039	-732,689	-936,955
Central of Georgia.....	Sept. 1,911	1,537,985	290,122	1,828,107	248,444	69,757	755,968	88,401	1,523,432	75.6	493,032	363,026	386,110
9 mos. 1,911		14,052,417	2,920,053	16,972,470	3,356,496	642,822	2,218,041	835,420	14,359,666	77.6	4,193,600	3,059,055	3,059,760
Central New Jersey.....	Sept. 690	3,798,710	856,227	4,654,937	965,477	62,436	1,747,744	119,883	3,406,434	69.6	1,508,834	1,010,213	910,282
9 mos. 690		33,159,524	6,810,450	40,000,000	8,708,166	494,712	16,025,404	1,183,483	39,141,553	72.5	11,714,894	7,951,071	6,884,765
Central Vermont.....	Sept. 412	205,745	120,395	326,140	38,919	19,967	299,235	23,441	652,178	62.6	137,445	121,807	105,639
9 mos. 412		2,057,317	1,156	2,058,473	304,117	857,266	3,041,137	292,963	6,376,472	121.3	-1,177,026	-1,304,206	-1,491,275
Chesapeake & Ohio.....	Sept. 2,728	9,233,810	620,437	9,854,247	2,227,686	13,484	2,709,305	2,641,100	6,735,775	61.3	4,248,911	3,628,350	3,873,349
9 mos. 2,721		82,516,585	5,456,639	87,973,224	13,001,948	1,185,049	23,377,933	2,670,702	62,504,753	68.2	29,119,789	23,291,209	25,229,022
Chicago & Alton.....	Sept. 1,028	1,831,672	483,753	2,315,425	296,294	70,487	92,136	31,857	1,851,934	72.5	700,859	595,437	405,214
9 mos. 1,028		14,846,133	4,249,397	19,095,530	4,630,646	716,997	7,990,362	616,833	16,681,614	78.9	4,458,072	3,506,039	1,854,162
Chicago & Eastern Illinois.....	Sept. 945	1,692,658	346,955	2,039,613	390,590	82,884	778,798	63,544	1,571,864	70.5	658,460	512,715	376,989
9 mos. 945		13,930,655	2,748,577	16,679,232	3,752,135	749,762	7,127,621	610,842	14,628,485	80.4	3,562,941	2,432,893	1,147,600
Chicago & Illinois Midland.....	Sept. 133	205,745	5,065	210,810	44,339	16,214	58,100	18,938	181,980	84.5	33,293	24,858	31,068
9 mos. 133		1,908,501	62,614	1,971,115	319,773	143,137	546,727	148,657	1,549,820	81.2	358,699	291,784	322,062
Chicago & North Western.....	Sept. 8,463	10,674,503	2,108,144	12,782,647	2,069,367	309,056	4,745,657	363,488	9,781,923	68.4	4,327,367	3,751,494	3,418,689
9 mos. 8,463		83,483,332	18,124,783	101,608,115	21,302,050	2,340,928	42,550,621	3,306,909	86,732,834	75.8	27,534,367	20,546,389	18,682,347
Chicago, Burlington & Quincy.....	Sept. 9,374	11,990,325	2,011,154	13,001,479	2,603,891	238,853	4,999,697	349,291	10,144,193	66.0	5,335,577	4,216,739	3,856,708
9 mos. 9,375		92,418,531	15,245,300	107,663,831	18,561,770	2,549,696	39,460,110	3,295,881	84,288,610	70.5	35,310,718	26,979,275	23,575,544



## Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1928—CONTINUED

Name of road	Av. mileage operated during period.	Operating revenues			Operating expenses			Total.	Operating ratio.	Net from railway operation.		Net operating income, 1927.
		Freight.	Passenger.	Total.	Traffic.	Trans- portation.	General.			income (or loss).	Net operating income.	
Chicago Great Western.....	Sept. 1,495	\$1,840,206	\$257,657	\$2,097,863	\$77,229	\$863,372	\$3,402	\$1,658,642	72.6	\$624,825	\$379,723	\$347,699
Chicago Great Western.....	9 mos. 1,495	14,511,032	2,338,288	16,849,320	7,380,111	7,880,111	58,829	14,511,075	72.6	3,716,723	1,611,777	1,408,699
Chicago, Indianapolis & Louisville.....	Sept. 647	1,245,732	18,025	1,263,757	39,650	32,673	32,673	1,085,762	68.5	3,498,826	4,477,783	294,917
Chicago, Indianapolis & Louisville.....	9 mos. 647	10,632,646	1,636,723	12,269,369	301,996	4,973,582	31,318	9,813,161	72.2	3,773,865	3,017,746	390,436
Chicago, Mil., St. Paul & Pacific.....	Sept. 11,251	13,219,684	1,564,581	14,784,265	333,142	5,096,984	348,225	10,982,324	67.6	5,272,699	4,406,485	3,524,355
Chicago, Mil., St. Paul & Pacific.....	9 mos. 11,251	100,251,519	13,908,638	114,160,157	2,785,436	43,667,071	3,249,823	94,361,823	74.9	31,585,267	24,250,528	19,808,752
Chicago River & Indiana.....	Sept. 20	.....	.....	.....	54,146	.....	12,678	301,152	55.5	1,557,691	1,099,427	293,493
Chicago River & Indiana.....	9 mos. 20	.....	.....	.....	544,233	.....	163,433	3,105,290	61.2	1,969,745	1,590,377	2,443,873
Chicago, Rock Island & Pacific.....	Sept. 7,564	9,125,581	1,738,997	10,864,578	249,997	3,928,823	340,023	8,202,672	70.4	3,512,427	2,801,648	2,430,516
Chicago, Rock Island & Pacific.....	9 mos. 7,564	76,584,666	14,530,123	91,114,789	2,158,774	37,713,346	3,019,029	73,886,013	74.1	25,836,013	19,666,696	16,057,172
Chicago, Rock Island & Gulf.....	Sept. 516	366,352	60,862	427,214	20,069	18,048	18,048	143,130	78.8	1,431,300	1,159,453	1,117,597
Chicago, Rock Island & Gulf.....	9 mos. 516	3,997,330	566,775	4,564,105	183,498	1,802,761	136,656	3,266,682	65.6	1,710,091	1,479,457	1,235,376
Chic., St. Paul, Minn. & Omaha.....	Sept. 1,746	2,035,296	408,384	2,443,680	38,468	956,690	81,146	1,953,611	73.6	702,387	573,801	473,299
Chic., St. Paul, Minn. & Omaha.....	9 mos. 1,746	15,225,073	3,245,611	18,470,684	367,437	8,467,890	685,986	17,002,606	84.6	3,092,476	2,053,244	1,473,650
Clinchfield Railroad.....	Sept. 309	.....	.....	.....	43,123	113,153	113,153	2,322,252	56.1	1,915,368	1,326,104	1,156,388
Clinchfield Railroad.....	9 mos. 309	4,841,313	149,069	5,000,382	199,781	1,095,957	137,739	3,188,708	62.6	1,907,755	1,272,324	2,107,700
Colorado & Southern.....	Sept. 1,035	974,505	130,779	1,105,284	15,456	359,167	42,731	743,866	62.3	449,563	385,117	351,000
Colorado & Southern.....	9 mos. 1,042	7,114,407	1,423,423	8,537,830	138,815	3,082,448	376,871	6,889,370	78.2	1,915,368	1,326,104	1,156,388
Fort Worth & Denver City.....	Sept. 695	714,235	164,125	878,360	84,437	325,440	335,951	5,358,800	58.4	4,243,367	3,611,387	2,329,282
Fort Worth & Denver City.....	9 mos. 596	6,149,892	1,445,521	7,595,413	1,169,275	2,422,291	339,783	5,345,819	65.3	2,843,632	2,392,453	2,046,001
Wichita Valley.....	Sept. 271	107,271	10,577	117,848	21,963	38,409	20,939	70,742	54.9	58,181	51,248	25,907
Wichita Valley.....	9 mos. 271	1,021,229	112,226	1,133,455	263,430	365,911	1,813	707,005	58.7	497,075	422,809	210,192
Columbus & Greenville.....	Sept. 167	129,513	163,245	292,758	27,188	53,838	11,117	112,639	61.1	50,606	43,357	33,283
Columbus & Greenville.....	9 mos. 167	1,007,509	170,117	1,177,626	4,223	53,838	101,855	1,114,844	89.5	130,219	120,513	14,598
Conemaugh & Black Lick.....	Sept. 23	117,685	.....	117,685	16,085	89,973	3,254	131,856	70.1	56,297	55,297	56,845
Conemaugh & Black Lick.....	9 mos. 23	715,161	.....	715,161	118,732	740,737	30,753	1,187,490	87.5	162,995	153,795	162,321
Delaware & Hudson.....	Sept. 881	2,830,132	383,745	3,213,877	54,174	1,221,146	134,521	2,558,869	73.9	904,835	548,186	600,854
Delaware & Hudson.....	9 mos. 881	24,188,873	2,783,794	26,972,667	487,865	10,719,427	1,452,054	23,068,994	79.0	4,276,097	4,289,596	5,116,343
Delaware, Lackawanna & Western.....	Sept. 998	5,024,675	1,145,822	6,170,497	155,518	2,545,833	172,441	4,701,807	67.5	2,262,941	1,655,871	1,711,491
Delaware, Lackawanna & Western.....	9 mos. 998	43,169,265	9,120,505	52,289,770	1,031,464	23,847,653	1,620,662	43,405,698	73.2	15,895,570	11,075,198	11,365,631
Denver & Rio Grande Western.....	Sept. 2,562	2,753,053	376,189	3,129,242	3,377,091	976,768	85,142	2,216,922	95.6	1,160,169	960,941	1,014,603
Denver & Rio Grande Western.....	9 mos. 2,556	18,750,188	2,892,020	21,642,208	4,866,298	7,033,429	783,308	18,066,003	76.8	5,443,434	3,741,487	4,358,413
Denver & Salt Lake.....	Sept. 232	375,706	15,004	390,710	62,080	61,510	11,761	214,984	51.2	205,217	195,217	200,875
Denver & Salt Lake.....	9 mos. 232	2,516,132	205,392	2,721,524	669,860	17,703	96,103	1,912,565	56.1	980,412	902,770	927,743
Detroit & Mackinac.....	Sept. 300	147,019	12,655	159,674	1,894	44,410	7,228	135,859	79.2	35,685	25,185	40,293
Detroit & Mackinac.....	9 mos. 308	1,052,971	111,877	1,164,848	17,909	393,665	52,388	1,044,660	83.0	214,043	114,505	141,584
Detroit & Toledo Shore Line.....	Sept. 50	408,018	.....	408,018	37,678	96,807	9,081	198,547	52.0	198,547	168,147	88,958
Detroit & Toledo Shore Line.....	9 mos. 50	3,544,720	.....	3,544,720	399,772	904,025	81,154	1,768,316	49.3	1,820,533	1,543,370	847,643
Detroit Terminal.....	Sept. 19	.....	.....	.....	24,709	90,617	4,220	134,906	61.1	85,724	63,930	64,983
Detroit Terminal.....	9 mos. 19	.....	.....	.....	179,909	738,977	34,935	1,072,159	62.4	471,764	481,307	422,748
Detroit, Toledo & Iron Range.....	Sept. 495	1,008,214	4,136	1,012,350	11,508	260,807	26,825	566,256	54.5	473,300	395,946	325,234
Detroit, Toledo & Iron Range.....	9 mos. 495	7,450,988	33,888	7,484,876	111,389	2,295,533	254,077	5,085,081	65.9	2,603,010	2,112,443	1,536,753
Duluth & Iron Range.....	Sept. 275	825,213	4,725	830,938	1,316	187,998	19,769	383,653	40.8	537,285	304,286	508,796
Duluth & Iron Range.....	9 mos. 275	4,491,220	42,805	4,534,025	15,237	1,300,591	184,784	3,313,029	64.2	1,846,465	1,479,879	1,501,368
Duluth, Missabe & Northern.....	Sept. 308	2,398,761	4,304	2,403,065	3,383	364,408	22,136	725,386	26.6	2,002,707	1,778,315	1,789,388
Duluth, Missabe & Northern.....	9 mos. 307	11,972,228	42,151	11,972,228	27,827	2,322,459	166,649	5,335,939	39.1	8,309,205	6,834,702	6,828,449
Duluth, Winnipeg & Pacific.....	Sept. 178	1,758,042	132,974	1,891,016	4,843	78,380	7,344	182,908	78.8	49,293	37,210	44,014
Duluth, Winnipeg & Pacific.....	9 mos. 178	14,536	20,323	14,556	43,450	672,077	69,287	1,608,317	81.4	367,660	267,225	253,349
Elgin, Joliet & Eastern.....	Sept. 460	1,775,218	31	1,775,249	235,535	379,935	51,135	1,322,812	68.0	621,987	501,698	345,373
Elgin, Joliet & Eastern.....	9 mos. 460	16,995,760	180	16,995,940	1,327,946	3,772,946	521,962	12,643,824	67.7	6,039,948	4,960,472	3,484,806
Erie Railroad.....	Sept. 2,047	8,073,812	957,186	9,030,998	1,257,879	1,950,635	314,041	7,243,770	73.6	2,597,880	2,221,117	2,161,325
Erie Railroad.....	9 mos. 2,047	65,347,121	8,205,323	73,552,444	9,979,662	18,118,195	2,638,104	63,914,176	79.8	16,224,303	12,966,140	12,418,103
Chicago & Erie.....	Sept. 269	1,126,246	56,536	1,182,782	182,491	120,959	38,346	742,640	57.5	548,288	479,557	172,757
Chicago & Erie.....	9 mos. 269	9,686,235	446,046	10,132,281	1,336,801	3,192,054	362,237	6,615,801	60.2	4,373,233	3,870,426	1,805,524
New Jersey & New York.....	Sept. 45	256,860	879,580	1,136,440	1,461	66,750	31,779	104,258	78.3	28,829	24,921	9,194
New Jersey & New York.....	9 mos. 45	2,566,860	879,580	3,446,440	15,356	626,692	31,779	3,127,222	87.9	142,122	106,949	192,895
New York, Susquehanna & West.....	Sept. 131	325,245	45,636	370,881	4,767	183,531	1,288	326,824	81.4	74,489	44,638	29,777
New York, Susquehanna & West.....	9 mos. 131	2,858,750	406,401	3,265,151	524,243	1,706,468	100,672	2,902,393	80.3	714,178	449,439	230,362
Evansville, Indianapolis & Terre Haute.....	Sept. 146	1,118,941	3,672	1,122,613	2,044	48,996	5,800	103,808	80.2	25,592	20,757	3,166
Evansville, Indianapolis & Terre Haute.....	9 mos. 146	1,227,152	34,591	1,261,743	20,446	507,184	53,731	1,001,636	76.4	310,139	267,932	242,237
Florida East Coast.....	Sept. 855	381,283	168,440	549,723	23,826	250,955	50,991	671,795	101.6	10,273	158,931	199,628
Florida East Coast.....	9 mos. 855	6,014,144	3,617,036	9,631,180	305,683	3,371,523	435,080	7,562,781	69.1	3,374,956	2,027,405	1,395,154

# Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1928—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Net from railway operation	Operating (or loss)	Net ry. operating income, 1927.
		Freight	Passenger	Total	(inc. misc.)	Way and structures	Maintenance of equip.	Traffic	Transportation				
Fort Smith & Western.....	249	138,648	111,697	250,345	1,574,440	22,754	27,316	\$5,675	\$44,446	67.4	\$106,182	\$7,030	\$31,169
Galveston Wharf.....	249	929,119	88,361	1,017,480	5,118,889	21,696	238,889	53,118	385,221	87.5	1,351,999	94,768	18,630
Galveston Wharf.....	13	.....	.....	.....	4,461	40,078	4,541	24,667	34,904	55.5	107,138	112,529	20,957
Galveston Wharf.....	13	.....	.....	.....	1,563,459	399,758	41,681	31,132	251,009	55.5	867,588	485,871	313,671
Georgia R. R. ....	328	315,422	64,345	380,767	411,213	50,739	77,466	24,140	170,694	84.1	345,903	52,300	151,734
Georgia & Florida.....	328	3,053,941	557,687	3,611,628	3,880,196	22,279	757,803	210,632	1,684,999	84.7	594,330	507,664	807,225
Georgia & Florida.....	445	1,053,819	126,437	1,180,256	1,264,370	25,476	20,560	8,952	52,381	91.4	1,030,300	1,820	4,373
Grand Trunk Western.....	345	1,645,374	189,546	1,834,920	1,935,638	197,475	180,896	82,808	481,406	82.0	1,016,540	144,098	155,259
Atlantic & St. Lawrence.....	345	14,193,036	1,684,591	15,877,627	16,675,119	2,104,467	3,375,598	43,882	589,295	69.6	589,205	497,653	424,964
Atlantic & St. Lawrence.....	166	128,859	28,755	157,614	181,627	47,440	34,470	5,993	87,510	102.4	4,588,300	3,796,615	2,732,466
Atlantic & St. Lawrence.....	166	1,467,585	269,423	1,737,008	1,917,525	543,971	330,388	53,480	1,077,397	109.3	179,224	311,404	859,042
Chic., Det. & Canada Gr. Tr. Jct.....	59	309,252	1,216	310,468	351,931	22,207	13,841	4,753	95,265	39.7	212,126	201,765	170,019
Detroit, Grand Haven & Mil.....	59	2,574,058	10,783	2,584,841	2,935,765	123,576	139,032	43,151	851,533	40.7	1,742,157	1,648,985	1,369,022
Detroit, Grand Haven & Mil.....	192	798,815	29,377	828,192	887,338	120,374	60,997	13,617	293,950	57.0	381,564	372,659	245,749
Detroit, Grand Haven & Mil.....	192	6,355,474	240,623	6,596,097	7,086,570	934,141	560,996	122,809	2,533,840	61.0	2,765,920	2,686,007	1,575,045
Great Northern.....	8,311	11,900,621	1,103,070	13,003,691	14,214,176	1,574,435	1,519,066	205,867	3,894,363	52.8	6,714,202	5,911,246	5,424,711
Green Bay & Western.....	8,243	68,935,561	8,781,358	77,716,919	86,026,188	12,607,674	4,068,330	2,171,008	28,260,681	69.6	26,155,768	19,666,682	18,855,706
Green Bay & Western.....	234	138,952	4,638	143,590	151,086	32,958	19,181	5,898	116,719	77.2	34,367	24,357	22,771
Green Bay & Western.....	234	1,169,057	47,758	1,216,815	1,279,631	214,381	178,403	49,185	590,179	74.8	322,441	244,226	201,605
Gulf & Ship Island.....	307	244,870	34,309	279,179	298,295	64,740	59,765	5,321	104,583	81.7	54,639	28,318	39,860
Gulf, Mobile & Northern.....	307	1,957,488	344,522	2,302,010	2,499,900	562,826	487,218	47,675	926,065	85.0	374,234	134,097	288,004
Gulf, Mobile & Northern.....	733	623,249	30,838	654,087	712,557	121,757	104,865	31,013	184,748	67.5	221,364	184,289	147,122
Gulf, Mobile & Northern.....	733	4,996,738	275,939	5,272,677	5,500,489	997,037	834,837	288,043	1,679,358	73.6	1,449,655	1,179,022	869,971
Hocking Valley.....	348	1,788,151	59,750	1,847,901	2,049,364	220,862	315,417	16,119	520,595	64.5	933,454	792,240	644,762
Illinois Central.....	348	13,201,144	540,805	13,741,949	15,121,240	1,698,375	2,947,438	150,256	4,289,241	52.8	5,628,040	4,535,502	3,791,676
Illinois Central.....	5,037	10,623,309	1,270,619	11,893,928	13,275,957	1,503,006	2,959,812	232,415	4,404,922	62.8	3,766,488	2,803,459	2,751,029
Illinois Central.....	4,989	88,095,919	16,247,342	104,343,261	112,668,073	13,679,055	26,931,792	2,335,934	40,352,219	77.4	25,426,953	17,994,174	19,937,781
Vazoo & Mississippi Valley.....	1,709	1,859,923	307,117	2,167,040	2,310,933	412,578	454,641	43,033	798,906	76.8	535,015	372,083	304,581
Illinois Central System.....	1,709	12,495,177	2,598,149	15,093,326	16,989,738	3,499,868	3,724,076	405,510	7,295,284	81.9	3,437,362	1,950,662	1,321,112
Illinois Central System.....	6,746	15,915,177	2,032,035	17,947,212	19,989,253	1,915,584	3,418,012	275,448	5,211,793	72.4	4,306,077	3,175,351	3,067,748
Illinois Central System.....	6,699	103,390,916	18,881,772	122,272,688	131,793,509	17,178,923	30,708,988	2,741,444	47,751,922	78.1	28,841,348	19,880,453	19,393,731
Kansas City, Mexico & Orient.....	272	153,362	5,596	158,958	166,942	59,888	45,142	7,261	55,918	106.2	10,325	14,596	7,003
Kansas City, Mexico & Orient.....	9 mos.	2,225,908	55,468	2,281,376	2,486,763	11,597,168	2,315,953	520,833	4,188,604	52.9	1,077,977	1,018,180	1,139,157
Kansas City, Mexico & Orient.....	465	463,368	17,549	480,917	490,949	67,470	72,878	8,078	101,568	59.8	197,464	189,941	148,239
Kansas City, Mexico & Orient.....	465	4,025,557	150,129	4,175,686	4,428,896	326,037	278,781	86,877	1,183,907	61.3	2,524,701	2,368,782	1,854,493
Kansas City Southern.....	784	1,359,793	104,232	1,464,025	1,629,774	188,243	264,153	59,570	449,370	64.1	584,609	501,805	455,721
Texasarkana & Ft. Smith.....	81	1,412,361	805,399	2,217,760	2,599,938	20,946	20,693	7,241	59,691	68.3	4,333,253	3,402,070	2,829,701
Texasarkana & Ft. Smith.....	81	221,148	8,246	229,394	259,938	20,946	20,693	7,241	59,691	46.7	138,583	126,446	99,600
Texasarkana & Ft. Smith.....	81	1,840,871	68,490	1,909,361	2,088,472	205,682	177,884	62,368	564,510	53.7	967,886	858,565	607,096
Kansas, Oklahoma & Gulf.....	325	304,470	2,950	307,420	312,947	18,011	17,659	.....	56,596	76.4	27,518	18,287	20,460
Kansas, Oklahoma & Gulf.....	326	2,225,622	26,943	2,252,565	2,490,161	580,004	217,182	97,809	57,888	40.0	187,839	177,283	167,628
Lake Superior & Ishpeming.....	160	301,986	810	302,800	354,243	41,860	23,944	568	64,122	63.4	839,986	743,493	607,430
Lake Superior & Ishpeming.....	160	1,669,496	14,004	1,683,500	1,930,442	342,185	235,748	4,780	450,796	57.8	218,845	182,089	180,262
Lake Superior & Ishpeming.....	160	4,297,526	5,413,364	9,710,890	10,572,450	1,226,603	2,136,840	1,311,928	40,095,241	76.5	12,287,778	9,602,520	8,200,960
Lake Terminal.....	13	.....	.....	.....	116,338	12,747	17,659	.....	56,596	76.4	27,518	18,287	20,460
Lake Terminal.....	13	.....	.....	.....	843,171	138,011	176,072	.....	464,966	94.4	46,866	5,197	35,008
Lake Terminal.....	96	201,854	1,954	203,808	213,198	24,227	31,256	2,584	81,689	70.4	63,993	48,031	30,317
Lake Terminal.....	96	1,932,239	14,134	1,946,373	2,044,049	217,671	303,950	22,867	751,422	67.7	659,402	527,917	469,870
Lehigh & New England.....	216	443,152	980	444,132	450,690	605,790	73,288	5,272	163,569	71.9	126,597	110,545	96,932
Lehigh & New England.....	216	3,066,557	12,754	3,079,311	3,906,455	864,001	47,132	1,442,933	154,755	75.7	965,717	833,034	804,123
Lehigh Valley.....	1,364	5,211,870	661,884	5,873,754	6,322,122	440,121	1,276,340	134,467	2,136,582	71.0	1,830,365	1,495,636	1,322,377
Lehigh Valley.....	1,364	42,975,260	5,413,364	48,388,624	52,383,019	5,322,221	10,572,450	1,226,603	21,368,406	76.5	12,287,778	9,602,520	8,200,960
Louisiana & Arkansas.....	301	318,811	10,430	329,241	335,840	45,461	53,591	11,605	77,626	60.1	134,100	100,696	88,183
Louisiana & Arkansas.....	301	2,665,446	90,945	2,756,391	2,822,848	47,715	488,960	112,500	728,985	65.3	980,618	706,448	593,084
Louisiana Ry. & Nav. Co.....	338	275,508	11,839	287,347	300,662	58,323	31,102	12,133	109,915	74.2	223,220	59,434	34,836
Louisiana Ry. & Nav. Co.....	336	2,288,208	96,785	2,384,993	2,494,581	473,634	306,412	116,940	979,105	80.6	484,613	286,003	54,685
Louisiana Ry. & Nav. Co. of Tex.....	206	77,502	4,251	81,753	85,291	19,136	16,144	3,285	37,146	95.2	4,071	63	11,486
Louisiana Ry. & Nav. Co. of Tex.....	206	688,287	32,810	721,097	753,841	213,864	132,162	27,895	347,014	102.3	771,100	54,067	48,250
Louisville & Nashville.....	5,077	9,026,711	1,495,392	10,522,103	11,225,090	1,813,439	2,399,999	215,680	3,791,228	76.1	2,679,591	1,982,526	2,072,951
Louisville & Nashville.....	5,077	81,642,879	13,296,010	94,938,889	100,973,512	15,703,500	23,048,696	2,174,600	35,479,894	76.3	20,891,905	13,382,665	15,511,167



Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1928—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues—Total			Operating expenses			Operating ratio	Net from operation	Operating income (or loss)	Net ry. operating income, 1927.
		Freight.	Passenger. (inc. misc.)	Total	Maintenance of way and equip. structures.	Traffic.	Trans- portation.				
Louisville, Henderson & St. Louis.....	Sept. 199	1,891,887	\$42,893	\$277,914	\$46,355	\$8,641	\$92,226	\$11,324	\$201,537	\$52,023	\$102,863
Louisville, Henderson & St. Louis.....	9 mos. 199	1,891,032	381,639	2,430,860	429,072	77,345	914,026	105,723	2,008,826	291,468	636,967
Maine Central .....	Sept. 1,122	1,105,653	294,530	1,571,684	265,084	593,901	54,694	1,244,335	327,318	206,693	237,318
Maine Central .....	9 mos. 1,122	10,505,975	2,627,072	14,517,847	2,266,971	17,314	5,658,420	47,725	11,330,433	2,193,451	1,897,507
Midland Valley .....	Sept. 364	326,168	15,029	349,996	48,156	7,327	79,148	12,769	180,853	155,890	129,660
Midland Valley .....	9 mos. 364	2,556,864	142,461	2,769,981	308,912	69,952	689,902	114,486	1,584,174	1,048,676	810,067
Minneapolis & St. Louis.....	Sept. 1,627	1,184,591	68,529	1,325,883	204,762	13,358	59,377	43,836	1,023,508	238,823	165,549
Minneapolis & St. Louis.....	9 mos. 1,627	9,332,826	667,754	10,582,899	1,727,468	317,859	4,822,766	394,927	9,391,412	633,039	74,972
Minneapolis, St. Paul & S. S. Marie, Sept. 4,385		4,548,832	473,203	5,405,827	612,600	74,191	13,448,890	1,063,159	3,274,677	1,864,540	1,662,099
Minneapolis, St. Paul & S. S. Marie, Sept. 9 mos. 4,385		29,078,344	3,948,816	35,816,127	5,163,651	719,271	13,448,890	1,063,159	27,332,786	6,564,427	5,304,020
Duluth, South Shore & Atlantic.....	Sept. 573	308,972	71,883	423,769	60,315	17,172	170,032	10,377	318,764	69,002	55,075
Duluth, South Shore & Atlantic.....	9 mos. 578	2,998,465	548,906	3,887,432	742,033	70,762	1,627,212	98,865	3,186,808	406,531	254,777
Spokane International .....	Sept. 165	93,768	10,796	112,648	19,412	3,557	34,460	6,289	74,477	32,647	20,977
Spokane International .....	9 mos. 165	756,468	94,625	914,101	146,896	31,653	287,981	57,330	616,174	248,241	182,210
Mississippi Central .....	Sept. 161	144,441	8,441	157,687	24,861	10,135	38,180	7,585	102,688	43,146	43,517
Mississippi Central .....	9 mos. 161	1,140,975	69,143	1,251,690	191,965	85,182	328,944	71,556	879,088	292,301	284,441
Missouri & North Arkansas.....	Sept. 364	135,775	11,672	156,814	42,217	9,118	53,356	8,199	130,794	26,020	13,078
Missouri & North Arkansas.....	9 mos. 364	1,031,889	101,580	1,208,567	285,226	86,091	499,131	74,850	1,121,388	87,179	63,539
Missouri-Kansas-Texas Lines .....	Sept. 3,188	4,214,326	558,655	5,196,368	678,072	113,316	1,402,250	423,325	3,451,836	1,744,532	1,216,338
Missouri-Kansas-Texas Lines .....	9 mos. 3,188	32,405,637	5,077,520	40,662,935	5,415,253	1,029,684	12,363,242	1,730,303	28,214,020	12,448,915	8,574,501
Missouri Pacific .....	Sept. 7,460	9,852,918	1,136,955	11,911,227	1,966,025	309,726	3,880,131	353,169	8,462,767	2,929,515	2,413,505
Missouri Pacific .....	9 mos. 7,439	78,251,196	10,278,775	96,257,878	15,510,752	2,659,384	33,435,745	3,355,190	73,138,222	19,045,792	15,182,635
Gulf Coast Lines.....	Sept. 1,026	904,751	132,781	1,100,143	183,713	39,336	306,402	58,113	806,750	247,852	227,407
Gulf Coast Lines.....	9 mos. 1,022	9,336,784	1,238,605	11,169,099	1,916,990	369,851	3,255,869	533,667	7,975,621	2,763,248	2,185,309
International-Great Northern .....	Sept. 1,159	1,493,447	188,587	1,836,023	235,022	34,009	584,259	71,136	1,194,075	596,463	513,552
International-Great Northern .....	9 mos. 1,159	10,727,420	1,636,870	13,505,305	2,172,883	316,756	5,450,294	605,418	10,783,764	2,400,219	1,660,821
San Antonio, Uvalde & Gulf.....	Sept. 318	122,300	18,316	155,353	29,085	5,400	60,496	6,815	126,769	24,759	2,912
San Antonio, Uvalde & Gulf.....	9 mos. 318	1,441,682	161,841	1,720,693	343,452	49,227	508,647	67,413	1,176,835	509,499	236,131
Texas & Pacific.....	Sept. 2,015	3,310,793	500,251	4,070,094	754,355	79,827	1,217,652	114,128	2,786,622	1,088,323	842,495
Texas & Pacific.....	9 mos. 2,015	30,128,298	4,416,119	36,609,036	5,753,918	717,945	11,794,215	999,918	25,132,635	9,865,126	7,143,583
Mobile & Ohio.....	Sept. 1,159	1,280,171	101,334	1,462,893	185,277	58,321	515,044	45,058	1,024,985	336,534	319,461
Mobile & Ohio.....	9 mos. 1,160	11,156,788	873,362	12,732,389	1,938,809	504,981	4,767,630	436,680	9,872,021	2,097,266	1,691,152
Monongahela .....	Sept. 171	579,900	12,182	596,507	75,000	1,201	150,338	10,208	292,871	303,633	184,178
Monongahela .....	9 mos. 171	5,127,165	137,307	5,306,563	725,000	9,913	1,348,032	95,471	2,864,330	2,241,112	1,383,170
Monongahela Connecting .....	Sept. 7	.....	203,343	22,708	22,708	300	85,133	3,409	139,095	64,230	50,964
Monongahela Connecting .....	9 mos. 7	.....	1,556,914	172,093	172,093	3,132	671,532	30,237	1,150,126	406,788	333,329
Montour .....	Sept. 56	170,933	.....	172,181	39,252	1,288	35,435	6,779	131,256	40,925	39,370
Montour .....	9 mos. 56	1,202,847	27	1,202,821	208,643	10,964	274,114	61,331	931,721	278,100	264,545
Nashville, Chattanooga & St. Louis.....	Sept. 1,259	1,551,279	271,333	1,998,091	218,929	76,449	659,601	79,138	1,423,536	574,555	474,428
Nashville, Chattanooga & St. Louis.....	9 mos. 1,259	13,200,775	2,548,436	17,174,546	2,213,275	747,453	6,018,352	720,627	13,429,027	3,040,609	3,069,900
Nevada Northern .....	Sept. 165	96,924	6,095	113,458	14,340	914	17,390	4,517	45,695	67,763	53,969
Nevada Northern .....	9 mos. 165	676,379	47,503	798,588	108,812	8,659	134,795	39,913	381,866	416,724	307,147
Newburgh & South Shore.....	Sept. 6	.....	180,241	20,501	20,501	.....	60,505	5,895	122,097	10,630	14,835
Newburgh & South Shore.....	9 mos. 6	.....	1,583,063	162,301	376,908	.....	597,631	49,204	1,186,036	241,494	258,462
New Orleans Great Northern.....	Sept. 276	248,078	18,111	274,276	36,558	13,580	82,356	11,305	180,274	94,002	75,967
New Orleans Great Northern.....	9 mos. 276	2,163,227	178,466	2,418,568	339,244	119,329	745,824	101,222	1,689,461	729,107	397,898
New Orleans Terminal.....	Sept. 20	1,992	.....	122,340	13,458	.....	10,356	1,389	32,049	79,284	63,080
New Orleans Terminal.....	9 mos. 20	13,847	.....	1,267,560	214,627	.....	475,675	15,889	775,442	92,118	321,117
New York Central.....	Sept. 6,906	19,824,448	8,869,532	33,209,173	4,779,765	471,339	11,132,771	1,087,409	24,536,853	6,334,844	6,347,789
New York Central.....	9 mos. 6,906	172,382,745	73,589,807	282,623,180	37,757,797	5,841	105,836	10,198,094	214,545,335	48,374,286	46,404,739
Cincinnati Northern .....	Sept. 244	2,881,654	45,306	3,006,863	373,189	56,319	1,009,236	96,559	2,157,443	814,220	645,060
Cincinnati Northern .....	9 mos. 244	23,813,130	4,130	23,817,260	67,109	67,109	1,009,236	96,559	2,157,443	814,220	645,060
Clev., Cin., Chicago & St. Louis, Sept. 2,396		5,882,748	1,304,944	7,823,014	1,667,755	145,561	2,891,156	339,897	5,904,538	1,323,384	1,729,014
Clev., Cin., Chicago & St. Louis, Sept. 9 mos. 2,396		49,852,254	11,041,473	66,605,265	14,288,455	1,369,018	24,757,936	2,397,392	51,050,845	15,554,420	10,047,556
Indiana Harbor Belt.....	Sept. 130	.....	1,148,057	106,633	106,633	4,452	373,292	2,307	680,412	438,567	389,318
Indiana Harbor Belt.....	9 mos. 130	.....	9,391,736	977,672	1,006,292	43,127	3,611,623	267,355	5,946,624	2,826,534	1,365,999
Michigan Central .....	Sept. 1,858	5,640,319	1,822,707	8,303,037	929,339	136,628	2,436,608	198,518	5,440,750	2,862,287	2,218,992
Michigan Central .....	9 mos. 1,858	47,819,471	15,104,932	69,701,993	7,575,740	1,173,673	21,993,961	1,928,208	47,120,850	17,843,112	17,076,742
Pittsburgh & Lake Erie.....	Sept. 231	2,329,363	205,226	2,619,183	388,216	30,812	826,022	75,152	2,180,486	438,697	274,940
Pittsburgh & Lake Erie.....	9 mos. 231	20,514,220	1,819,010	23,099,222	3,096,214	271,765	7,439,306	751,970	19,051,347	4,038,875	2,571,330
New York, Chicago & St. Louis, Sept. 1,690		4,350,051	192,448	4,694,412	529,381	124,374	1,501,231	132,425	3,099,986	1,588,213	1,161,261
New York, Chicago & St. Louis, Sept. 9 mos. 1,690		36,608,778	1,398,428	39,245,782	5,103,696	1,142,469	13,816,163	1,263,858	28,631,643	8,382,510	6,507,789

## Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1928—CONTINUED

Name of road	Av. mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from railway operation.	Operating income (or loss).	Net operating income.	Net operating income, 1927.
		Freight.	Passenger. (inc. misc.)	Total.	Way and structures.	Traffic.	Trans- portation.					
N. Y., New Haven & Hartford.....	Sept. 2, 146	\$6,145,984	\$4,216,908	\$11,651,376	\$1,482,095	\$1,942,060	\$96,501	\$3,528,817	\$11,011	\$7,528,727	\$3,552,221	\$2,940,989
9 mos.	2,153	55,013,307	100,939,380	14,663,130	14,663,130	870,163	32,901,372	2,857,084	71,346,633	24,142,039	19,121,417	18,094,798
New York Central.....	Sept. 20	212,247	.....	242,780	33,109	12,182	.....	39,918	1,457	68,666	114,303	137,255
9 mos.	20	1,780,635	.....	2,048,946	226,345	111,023	.....	389,205	15,259	741,832	946,403	856,948
New York, Ontario & Western.....	Sept. 569	756,214	228,803	1,155,246	190,670	198,928	18,770	473,495	33,366	918,769	191,476	167,576
9 mos.	569	6,024,681	2,046,471	9,640,118	1,406,942	1,719,795	172,855	4,216,492	307,216	7,876,054	1,338,306	823,689
Norfolk & Western.....	Sept. 2,241	8,545,305	538,087	9,376,588	1,360,012	1,642,464	108,159	2,208,786	2,380,200	5,564,585	3,110,683	3,395,443
9 mos.	2,241	69,869,361	4,383,547	76,936,304	11,767,288	14,597,819	1,012,346	19,681,527	2,293,412	49,348,546	20,608,561	22,766,992
Norfolk Southern.....	Sept. 931	591,993	46,112	684,933	107,068	118,666	26,271	267,631	27,810	547,022	72,188	55,405
9 mos.	931	6,064,969	386,773	8,977,977	897,977	980,540	249,808	2,555,094	267,287	4,933,929	1,189,327	1,189,327
Northern Pacific.....	Sept. 6,772	8,835,695	951,441	10,635,132	1,008,483	1,260,792	194,530	2,983,933	2,400,566	6,185,046	3,391,488	3,606,663
9 mos.	6,716	57,432,580	8,360,487	72,288,946	10,359,118	14,164,839	1,979,566	24,272,799	2,283,252	53,849,308	11,744,117	15,064,291
Northwestern Pacific.....	Sept. 477	439,853	160,325	663,017	109,129	85,477	10,103	270,880	21,122	496,593	74,9	166,442
9 mos.	477	2,946,871	1,396,065	4,862,435	939,060	798,027	83,008	2,194,582	212,103	4,225,299	637,142	278,538
Pennsylvania R. R. ....	Sept. 10,485	39,993,972	11,834,592	57,296,570	7,919,648	10,522,360	7,823,122	18,782,621	1,573,628	40,226,281	70,2	17,070,289
9 mos.	10,485	333,623,286	99,706,830	477,993,779	61,343,206	97,138,651	7,364,915	168,288,819	14,429,588	354,441,723	95,968,781	84,517,447
Baltimore, Chesapeake & Atlantic.....	Sept. 130	87,706	36,960	133,891	18,818	16,450	1,847	75,706	1,869	114,690	6,994	2,913
9 mos.	130	695,035	265,824	1,028,910	119,714	466,167	17,531	1,229,717	20,442	1,284,096	1,069,475	299,269
Long Island.....	Sept. 403	1,008,155	251,956	3,733,076	480,796	398,984	30,800	1,299,747	83,541	2,284,057	1,069,475	926,124
9 mos.	403	8,417,589	20,352,911	30,545,563	3,887,144	4,215,646	309,633	12,089,443	747,334	21,275,540	7,061,259	5,744,209
West Jersey & Seashore.....	Sept. 370	419,147	596,490	1,062,539	119,158	126,475	6,671	405,780	18,280	677,885	229,347	200,197
9 mos.	370	3,573,554	4,318,084	8,290,561	1,171,690	1,156,608	127,712	3,617,639	215,413	6,294,508	995,078	721,750
Peoria & Pekin Union.....	Sept. 19	28,507	1,785	159,176	16,688	15,074	4,453	60,341	7,138	103,694	65,2	55,582
9 mos.	19	236,908	15,479	1,455,843	158,787	126,367	31,376	67,620	67,620	986,399	309,116	505,568
Pere Marquette.....	Sept. 2,244	3,913,048	278,666	4,458,789	525,614	752,224	66,944	1,326,797	107,914	2,775,588	62,2	1,683,201
9 mos.	2,244	29,234,313	2,340,442	33,588,128	3,911,966	6,805,666	579,919	11,036,737	986,927	23,306,276	69,4	10,281,852
Pittsburgh & Shawmut.....	Sept. 102	134,112	2,238	138,076	23,994	29,936	1,730	42,997	7,693	106,340	30,312	29,128
9 mos.	102	1,373,952	34,252	1,427,978	189,988	304,083	16,353	395,872	60,749	967,045	67,7	460,933
Pittsburgh & West Virginia.....	Sept. 92	381,717	4,975	428,011	38,312	71,455	15,667	69,861	18,086	223,102	52,1	204,917
9 mos.	92	2,944,672	48,250	3,283,153	212,514	628,992	137,072	599,199	177,656	1,843,405	56,1	1,439,848
Pittsburgh, Shawmut & Northern.....	Sept. 198	159,649	1,619	165,646	1,613	49,083	6,297	128,867	6,297	128,867	74,2	43,779
9 mos.	198	1,397,972	17,253	1,444,649	309,377	277,022	15,207	452,441	53,437	1,108,964	336,565	308,980
Quincy, Omaha & Kansas City.....	Sept. 249	56,802	7,384	71,959	Cr.11,983	9,614	712	26,846	2,301	27,388	38,1	44,571
9 mos.	249	409,713	79,619	548,785	200,190	76,932	6,596	252,816	22,348	646,451	117,8	97,666
Reading.....	Sept. 1,136	6,086,643	647,423	7,243,403	1,033,427	1,573,063	96,595	2,621,764	1,197,523	5,282,012	76,3	1,715,391
9 mos.	1,136	55,352,664	5,915,958	64,994,881	8,988,931	15,412,017	794,961	24,427,617	1,919,447	51,626,754	79,8	13,068,127
Atlantic City.....	Sept. 163	108,805	248,260	380,682	70,346	33,216	3,270	201,696	5,493	314,400	92,6	66,282
9 mos.	162	1,012,520	3,018,549	618,258	258,808	67,826	1,779,339	75,864	2,786,733	2,786,733	92,3	231,818
Perkionen.....	Sept. 41	875,934	29,736	115,208	11,499	5,039	106	42,966	1,212	60,851	52,8	54,357
9 mos.	41	875,934	29,736	115,208	11,499	5,039	106	42,966	1,212	60,851	52,8	54,357
Port Reading.....	Sept. 19	120,634	.....	175,615	19,736	18,722	229	64,172	1,440	104,299	59,4	71,346
9 mos.	19	1,238,767	.....	1,650,747	180,381	121,086	2,061	276,075	26,990	906,185	54,9	744,232
Richmond, Fredericksburg & Potomac.....	Sept. 117	308,608	287,646	751,400	78,239	145,150	8,567	269,126	34,232	549,372	73,1	202,028
9 mos.	117	4,052,819	2,819,237	8,354,925	972,542	1,434,452	86,686	2,953,430	326,830	6,013,242	72,0	2,341,684
Rutland.....	Sept. 413	301,920	117,309	366,232	126,444	95,719	9,670	195,851	15,839	445,499	78,7	120,743
9 mos.	413	2,836,170	1,015,806	5,111,648	1,038,819	1,401,006	103,560	1,885,900	142,951	4,102,775	80,3	1,008,873
St. Louis-San Francisco.....	Sept. 5,313	5,927,574	977,439	7,455,729	1,313,532	2,271,721	128,739	2,271,721	222,669	4,869,763	65,2	2,585,966
9 mos.	5,249	47,527,484	8,719,060	60,740,181	7,667,955	12,017,354	1,128,734	20,274,923	2,079,375	42,595,995	70,13	18,144,186
Ft. Worth & Rio Grande.....	Sept. 233	89,782	10,263	112,622	20,188	19,612	3,065	47,022	2,324	91,907	81,6	20,715
9 mos.	233	699,323	103,576	914,650	187,372	184,954	30,481	467,855	46,515	912,110	99,7	2,540
St. Louis, San Francisco & Texas.....	Sept. 154	158,905	11,770	178,193	22,377	26,730	5,409	60,121	7,669	122,110	68,5	56,083
9 mos.	144	1,183,128	103,664	1,336,477	223,157	226,928	44,310	509,961	64,363	1,065,690	79,7	270,787
San Diego & Arizona.....	Sept. 156	61,008	13,874	78,870	16,727	3,898	24,228	10,106	10,106	75,341	95,5	3,529
9 mos.	156	734,506	133,862	926,187	160,697	152,335	36,187	261,142	80,105	702,728	75,9	223,530
Seaboard Air Line.....	Sept. 4,499	32,241,541	6,078,648	42,339,872	4,910,164	7,051,400	1,794,901	15,968,423	1,649,574	31,255,483	81,6	7,288,903
9 mos.	4,499	32,241,541	6,078,648	42,339,872	4,910,164	7,051,400	1,794,901	15,968,423	1,649,574	31,255,483	81,6	7,288,903
St. Louis Southwestern.....	Sept. 940	1,332,847	91,112	1,505,093	175,958	261,305	69,392	391,243	67,756	968,707	64,4	536,386
9 mos.	940	11,813,917	738,441	13,180,965	1,750,565	2,091,540	613,948	3,495,753	580,565	8,594,565	65,2	4,586,005
St. Louis Southwestern of Texas.....	Sept. 807	714,711	49,375	821,327	219,072	130,773	34,222	272,840	34,328	696,479	84,8	124,848
9 mos.	807	4,559,338	402,871	5,415,409	1,717,497	1,109,439	276,195	2,309,282	307,488	5,767,641	106,5	352,232
San Diego & Arizona.....	Sept. 156	61,008	13,874	78,870	16,727	3,898	24,228	10,106	10,106	75,341	95,5	3,529
9 mos.	156	734,506	133,862	926,187	160,697	152,335	36,187	261,142	80,105	702,728	75,9	223,530
Seaboard Air Line.....	Sept. 4,499	32,241,541	6,078,648	42,339,872	4,910,164	7,051,400	1,794,901	15,968,423	1,649,574	31,255,483	81,6	7,288,903
9 mos.	4,499	32,241,541	6,078,648	42,339,872	4,910,164	7,051,400	1,794,901	15,968,423	1,649,574	31,255,483	81,6	7,288,903



## Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1928—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income	Net operating income, 1927
		Freight	Passenger, (inc. misc.)	Total	Way and structures	Traffic	Trans-shipment					
Southern Ry. ....	6,770	\$8,843,223	\$2,144,063	\$11,987,286	\$1,911,459	\$257,244	\$3,949,180	70.3	\$3,560,422	\$2,689,467	\$2,650,791	\$4,036,149
Alabama Great Southern.....	9 mos.	79,957,226	18,298,460	106,586,023	16,130,765	2,408,205	35,665,614	72.2	29,625,912	22,902,040	21,226,524	23,986,860
.....	9 mos.	680,645	157,171	827,407	146,153	23,408	236,821	66.8	29,437	226,966	234,566	253,884
.....	9 mos.	5,641,376	1,345,638	7,478,014	1,316,516	198,048	2,246,388	73.8	1,956,504	1,401,404	1,462,923	1,774,893
Cinn., New Orleans & Tex. Pacific.....	338	1,433,030	279,660	1,712,690	307,852	47,894	468,456	68.0	579,875	463,086	475,561	439,154
Georgia Southern & Florida.....	338	12,859,398	2,516,015	16,235,859	2,560,102	389,165	4,580,858	69.8	4,908,406	3,916,015	3,704,565	3,770,396
.....	397	230,693	93,728	324,421	94,972	3,895	126,753	87.1	44,562	20,963	29,176	87,438
.....	399	2,051,461	992,434	3,318,986	715,722	87,954	1,385,642	90.3	301,763	104,403	99,591	101,523
New Orleans & Northeastern.....	204	369,647	67,555	469,134	69,856	12,915	139,786	67.4	152,910	101,774	60,318	131,769
Northern Alabama .....	204	3,150,117	628,303	4,055,739	578,813	113,971	1,200,691	68.3	1,265,860	864,036	581,193	720,026
.....	110	88,606	7,695	98,838	25,782	1,651	39,090	66.3	35,321	27,421	7,752	32,584
.....	110	731,649	60,023	815,270	171,811	17,615	293,175	71.2	234,781	180,080	75,752	146,520
Southern Pacific .....	8,899	15,540,840	3,247,937	20,639,147	2,367,618	358,217	6,445,982	63.3	7,584,068	5,893,580	5,196,517	5,692,647
So. Pacific Steamship Lines.....	8,899	117,422,982	29,723,744	162,211,879	20,475,085	3,705,417	53,181,691	89.3	49,483,311	36,416,679	33,072,097	31,866,206
.....	9 mos.	6,709,323	534,934	8,295,365	161,462	17,615	5,884,620	88.2	106,342	103,560	108,001	128,841
.....	9 mos.	.....	.....	.....	.....	.....	.....	92.6	616,358	581,178	597,424	998,355
Texas & New Orleans.....	4,728	5,151,173	907,135	6,591,590	909,270	165,772	2,015,046	67.9	2,113,675	1,696,683	1,466,183	1,166,628
Spokane, Portland & Seattle.....	4,728	38,614,564	8,156,680	50,775,687	8,549,488	1,581,989	18,139,056	80.7	9,807,915	6,863,082	5,428,587	3,681,541
.....	554	720,086	105,516	901,636	155,812	10,053	237,689	58.3	376,034	285,245	235,580	303,086
.....	554	5,320,774	891,900	6,791,739	1,094,345	102,499	1,961,079	63.3	2,491,680	1,716,671	1,638,745	1,661,367
Tennessee Central .....	296	257,693	19,649	292,573	57,165	8,057	95,855	70.7	85,691	75,552	54,904	39,714
Terminal Railroad Assn. of St. L.....	296	2,126,901	179,232	2,426,103	492,309	34,544	78,904	78.3	527,357	466,646	297,984	284,761
.....	55	.....	.....	.....	.....	.....	.....	64.6	387,888	299,942	388,129	344,787
.....	55	.....	.....	.....	.....	.....	.....	68.3	3,106,996	2,228,606	1,974,107	3,029,767
Texas Mexican .....	162	83,615	5,607	99,301	17,511	3,460	36,339	81.2	18,646	13,646	5,302	8,955
Toledo, Peoria & Western.....	162	850,536	39,233	934,444	139,047	34,290	330,952	74.1	246,832	201,625	135,001	24,745
.....	239	187,248	1,120	205,893	22,386	11,021	73,359	68.0	65,864	59,120	40,734	29,056
.....	239	1,508,315	17,005	1,589,119	341,358	97,520	543,830	77.4	358,742	319,827	202,234	15,004
Toledo Terminal .....	28	.....	131,524	131,524	7,043	532	46,997	57.2	56,281	40,106	64,400	23,444
Trinity & Brazos Valley.....	28	.....	1,109,720	1,109,720	77,758	5,120	426,474	62.7	414,282	260,089	497,894	430,050
.....	367	220,269	237,184	457,453	37,946	5,533	80,220	70.6	69,627	61,962	38,649	37,858
.....	367	1,620,586	69,490	1,753,508	406,272	48,323	731,465	77.1	1,725,334	1,390,815	2,306,110	1,628,896
Ulster & Delaware .....	128	42,276	24,579	110,910	23,111	1,329	50,876	86.0	15,570	9,820	4,935	7,538
Union Railroad of Penna.....	128	331,816	944,790	1,476,606	147,511	13,088	428,815	81.9	171,172	119,421	83,094	77,351
.....	45	.....	.....	.....	.....	.....	.....	65.5	319,742	267,630	188,302	188,302
.....	45	.....	.....	.....	.....	.....	.....	77.1	1,725,334	1,390,815	2,306,110	1,628,896
Union Pacific .....	3,749	11,268,689	1,448,361	13,641,837	1,142,044	168,569	3,203,953	53.3	6,372,603	5,690,906	4,963,810	4,754,378
Oregon Short Line.....	3,749	68,318,872	11,583,345	87,243,722	10,442,180	1,632,121	23,338,613	66.2	29,503,329	23,312,562	20,327,215	16,999,128
.....	2,539	3,642,390	343,512	4,263,575	431,278	55,601	1,041,769	51.1	2,086,688	1,811,145	1,665,712	1,361,404
.....	2,539	22,615,014	3,068,714	27,752,943	4,552,928	599,183	7,951,940	69.3	8,521,676	6,084,809	5,185,236	3,981,868
Oregon-Wash. R. R. & Nav. C.....	2,365	2,409,011	301,231	2,966,297	412,288	76,275	983,513	68.5	933,860	744,543	588,613	640,608
Los Angeles & Salt Lake.....	2,349	17,045,605	2,617,214	21,742,154	3,494,665	692,823	7,995,310	82.0	3,919,040	2,206,339	884,034	1,230,501
.....	1,209	1,595,805	445,638	2,333,354	362,811	70,594	677,215	72.5	641,828	501,348	387,689	477,434
.....	1,209	12,467,200	3,709,917	18,260,964	3,226,175	698,867	5,732,824	81.0	3,462,068	2,216,991	1,294,129	1,397,041
St. Joseph & Grand Island.....	258	378,401	11,528	417,229	107,418	3,948	130,792	72.0	116,710	96,416	62,810	64,019
Utah .....	258	2,699,418	107,691	3,002,444	619,241	32,161	1,014,351	71.3	862,175	682,930	502,399	234,942
.....	111	1,172,335	.....	1,172,335	35,194	344	32,246	66.0	54,923	44,315	28,487	27,269
.....	111	.....	.....	.....	.....	.....	.....	75.1	292,924	225,757	144,303	305,261
Virginian .....	545	1,480,033	36,320	1,592,450	101,738	14,844	321,596	48.9	813,108	648,097	698,086	775,106
Wabash .....	545	12,602,926	328,709	13,683,151	1,556,025	171,724	2,930,511	57.2	5,850,634	4,524,370	4,896,587	7,461,758
.....	2,524	5,199,742	637,895	6,231,420	916,966	131,575	2,193,010	71.8	1,735,425	1,518,163	1,229,250	1,199,480
.....	2,524	43,117,329	5,511,552	52,253,266	7,437,012	1,531,073	19,822,123	75.6	12,735,466	10,493,905	7,750,699	6,722,198
Ann Arbor .....	293	462,960	17,679	501,751	51,834	12,831	176,909	293.86	176,909	107,942	63,241	46,013
Western Maryland .....	293	4,042,777	166,720	4,380,615	484,034	128,812	1,653,752	72.9	1,100,977	875,135	645,986	558,206
.....	875	1,490,626	33,087	1,561,990	202,140	40,941	491,695	62.4	587,419	507,419	529,168	577,365
.....	875	12,975,115	298,988	13,698,589	2,165,614	378,665	3,784,435	68.6	4,305,558	3,670,558	3,731,954	4,441,055
Western Pacific .....	1,050	1,716,798	144,090	2,105,610	253,680	69,054	603,369	64.6	745,926	692,070	606,074	569,020
Wheeling & Lake Erie.....	1,050	10,086,076	1,236,075	12,367,619	2,812,795	541,106	4,377,147	87.5	1,548,053	692,070	1,008,343	1,434,040
.....	511	1,810,896	267,269	1,959,893	332,924	34,589	1,268,843	64.7	691,050	530,742	500,539	246,377
.....	511	14,147,616	243,513	15,329,439	1,949,478	312,001	4,306,601	67.3	5,020,228	3,707,752	3,620,074	2,679,527
Wichita Falls & Southern.....	168	80,588	1,741	87,308	16,115	13,857	23,108	67.3	38,235	23,250	22,988	32,429
.....	168	708,948	21,233	771,002	142,288	23,555	359,300	69.88	232,260	186,608	166,467	196,514

## News Of The Week

(Continued from page 981)

Aug. 27—Eastern Railroad opened, East Boston to Salem.  
Oct. 8—Nashua & Lowell Railroad opened.  
Dec. 3—Hartford & New Haven opened to Meriden.

1851

Jan. 27—Ashuelot Branch opened.  
June 10—Wilton Railroad opened.  
Sept. 17, 18, 19—Railroad Jubilee in Boston.  
Oct. 1, 2—Famous locomotive races on Boston & Lowell.  
Dec. —Watertown Branch opened to Waltham.  
Work commenced on the Hoosac Tunnel this year.  
Vermont Valley Railroad opened this year.

1881

July 13—Canal Road (New Haven & Northampton) opened through to Shelburne Falls.  
July 24—New York & New Haven opened from Waterbury to Danbury.  
Sept. 5—Boston & Albany station, Kneeland Street, Boston, opened.  
Oct. 1—Massachusetts Central opened.  
Oct. 6—Hanover Branch engine "Hanover" ran wild on main line. No harm done.  
Oct. 31—Turners Falls Branch opened.

1911

May 31—Four-tracking the New Haven cut completed.  
May —Electric engines first used in the Hoosac Tunnel.  
June 4—New Union Station, Worcester, opened.  
July 31—Greenbush, Mass., first used as terminal.

1923

Jan. 1—Through sleeper to St. Petersburg, Fla., on "Colonial Express."  
June 11—Broad Street (Philadelphia) station burned.  
Nov. 11—"Everglades Limited," first trip.

1924

June 15—"Washington-Montreal Express," first trip.  
June 15—Dudley Street station changed to Upham's Corner.  
Sept. 28—"Merchants Limited" scheduled to run on Sundays.  
Oct. 24—Ground broken electrification South Norwalk to Danbury.  
Nov. 20—Castleton bridge opened.

Other articles in this bulletin are: Steam tramways in Great Britain and Ireland; the English locomotive "James Toleman," which was exhibited at the Chicago World's Fair in 1893; early days on the Southern Pacific; and an article on the South Carolina Canal and Railroad, which includes a three-page list of early locomotives (1830-1868).

## Foreign

### Crossing Protection in France

Installation of a system of automatic signals and lights, for the protection of all grade crossings in France, is proposed in a number of decrees which await the approval of the cabinet. It is planned to have the approaching train operate the signals which, in addition to lights, will be equipped with electric horns to warn the motorist.

According to the report there are 33,851 grade crossings in France with 5,230 of these without signals or warning devices of any kind. In 1927 there were 456 accidents with 210 deaths at these crossings. The number of crossing accidents increased from 181 in 1922 and the number of fatalities from 136.

### Death of W. J. Thorrowgood

William J. Thorrowgood, one of the leading signal engineers of England, died on October 18. Mr. Thorrowgood retired about a year ago from the position of signal and telegraph superintendent of the Southern Railway to which position he was appointed in 1923 on the formation of the Southern Railway. He had been at the head of the signal department of one of the constituent companies, the London & Southwestern, since 1918. He was a leader in the establishment of the Institution of Railway Signal Engineers and in recent years was a pioneer in the introduction of four-aspect color-light signals.

### French Railway Taxes

Taxes paid by the five major private railways of France amounted in 1927 to 2,569,000,000 francs or approximately \$102,700,000 and were equivalent to six per cent of the French national budget,

according to reports issued by the United States Department of Commerce.

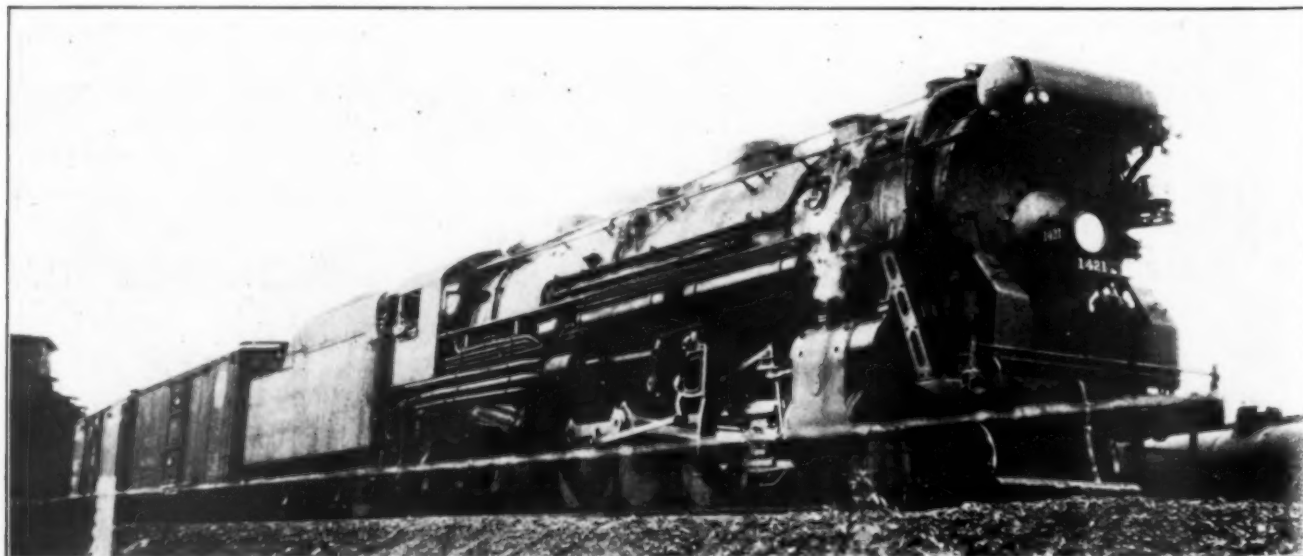
The largest of these railway taxpayers was the Paris-Lyons-Mediterranean which was assessed 958,000,000 francs or \$38,320,000 while the Paris-Orleans, paying 500,000,000 francs or \$20,000,000 was second.

According to the taxation scheme now in force the government collects 10 per cent on freight receipts and a graduated tax on the sale of passenger tickets, running as high as 60 per cent on first class de luxe fares and averaging 32.5 per cent on combined passenger receipts. The Orleans and the Southern roads reported respective deficits of 84,000,000 francs and 74,000,000 francs after tax payments. Prior to the war the government tax on railway receipts was limited to 12 per cent on gross passenger revenue only.

### Extension of A. T. C. in England

The Great Western Railway of England which has had cab signals in use for more than 20 years and, in connection with cab signals, automatic train control for 18 years or more, has decided to extend the use of the system over 75 miles of road. The principal line on which automatic train control is already in service is that from London, westward to Reading, 36 miles, four-track. The extensions now to be made are: Reading, westward to Didcot, 17 miles, four-track; and thence 24¼ miles farther, double-track, to Swindon. From Didcot on the line to Oxford, 10 miles, double-track; and from London on the line to Birmingham, as far as High Wycombe, 23¼ miles, double-track.

The Great Western has in operation, 244 locomotives fitted with automatic train control, all having the vacuum brake; and with the completion of the plans now announced, all locomotives operating passenger trains into London will be equipped with automatic train control apparatus.



On the Boston & Albany at Worcester, Mass.



## Traffic

The LCL Corporation announces that it has closed a contract with the Missouri Pacific for the use of its containers throughout the lines of that system.

The Denver & South Plains, the branch line of the Colorado & Southern from Estelline, Tex., southwest to Lubbock, 202 miles, will be opened to traffic on November 24.

The Interstate Commerce Commission has denied the petition, filed August 1 on behalf of Western trunk lines, for permission to file blanket supplements increasing commodity rates as a measure of emergency relief.

On the occasion of recent church celebrations in New Orleans, La., the flowers shipped to that city from California, mostly from San Francisco, amounted to nearly 50 tons, largely chrysanthemums. Ten refrigerator express cars were used to carry these flowers. San Mateo County, California, produces seven million dollars' worth of cut flowers annually.

### N. I. T. League

The National Industrial Traffic League will hold its next meeting at Hotel Astor, New York City, on Thursday and Friday, November 22 and 23.

### Freight Commodity Statistics

The total revenue freight originated by Class I railroads in the first six months of 1928 amounted to 582,707,656 tons, a decrease of 5.85 per cent as compared with the corresponding period of last year, according to the Interstate Commerce Commission's monthly summary of revenue traffic statistics. For the second quarter of the year the tonnage originated was 308,399,509, a decrease of 3.31 per cent.

For the half-year products of agriculture, animals and products, and manufactures and miscellaneous showed increases but other groups of commodities showed reductions. The largest reduction was in products of mines 10.96 per cent, while products of forests showed a decrease of 4.02 per cent and l. c. l. freight a decrease of 4.35 per cent. Products of agriculture showed an increase of 1.03 per cent, animals and products an increase of 1.48 per cent, and manufactures and miscellaneous an increase of 2.63 per cent.

### Costs of Transporting Canadian Coal

No definite statistics of costs in connection with the test shipments of coal from Alberta and the Maritime Provinces to Central Canada will be available until next March, according to Alistair Fraser, counsel for the Canadian National and E. P. Flintoft, for the Canadian Pacific, who appeared before the Dominion Railway Board at Ottawa last week. Mr. Fraser told the Board which was sitting

in hearing upon the costs of these experiments, that while 10 per cent. of the cost entering into the movement was a known element, the remaining 90 per cent. was unknown and could only be ascertained when the balance sheets of the company were made up.

Mr. Fraser presented a number of exhibits showing that his company moved 714 cars, representing 39,855 tons of Alberta coal to Ontario points during the three months' period of the experiment. In the same period the C. P. R., moved 150 cars, or 5,799 tons.

The Maritime movement of rail-hauled coal, waterborne to Montreal and Quebec, had been heavier. The Dominion Fuel Board had authorized 297,250 tons to Montreal and 145,000 to Quebec, and of this 47,865 tons had been forwarded from these points.

The board sat in conformity with the orders-in-council, which required them to meet and examine the transportation costs with a view to authorizing the reimbursement by the government of the railway companies for any losses entailed in the \$6.75 per ton rate of the railway from Alberta to Ontario, and the one-fifth of a cent per ton mile reduction in the westward haul of Maritime coal. Chief Commissioner McKeown presided, and present were Commissioners S. J. McLean, Thomas Vien, C. Lawrence and T. C. Norris.

With regard to Maritime coal, there had been no all-rail movement yet. A total of 297,250 tons of waterborne coal had been authorized by the Dominion Fuel Board for shipment west of Montreal and 145,000 tons from Quebec. Of that amount 47,865 tons had been re-distributed to town in the Eastern Townships of Quebec and in Ontario. From Quebec 5,799 tons.

The figures given by Mr. Flintoft for the Canadian Pacific showed that this company had moved 150 cars, totalling 5,799 tons.

In a general discussion which ensued, Mr. Woods (of counsel for Alberta) asked that the board establish a definite system of arriving at expenses, and was informed by the chief commissioner that when the railway companies had presented their figures the board would exercise supervision. Mr. Fraser asked Mr. Woods if he would object to the government turning over to the C.N.R. the difference between \$6.75 per ton and \$10.07, (the figure previously reached by the railway commission) pending adjustment of accounts, should the costs fail to be ready before the end of the present fiscal year. Mr. Woods asserted emphatically that he would take strong objection to such a course. Mr. Duchemin (of counsel for Nova Scotia) asked that the future experiments, which will continue for the next two years, a system of accounting be set forth by the board in order that all might be acquainted with it.

Assistant Chief Commissioner S. J. McLean suggested that within the next two weeks the parties concerned might get together and arrange something along these lines.

## Equipment and Supplies

### Locomotives

THE ILLINOIS CENTRAL is inquiring for four electric switching locomotives.

THE WESTERN PACIFIC is inquiring for 10 locomotives of the 2-10-4 type.

THE GREAT NORTHERN is inquiring for 6 locomotives of the 4-8-4 type.

THE CANADIAN PACIFIC will build at its Angus shops, 6 single-track snow plows and 1 double-track snow plow.

### Freight Cars

THE WESTERN PACIFIC is inquiring for 50 flat cars and 250 automobile cars.

THE PACIFIC FRUIT EXPRESS is inquiring for 600 steel underframes.

CENTRAL VERMONT see Canadian National.

GRAND TRUNK WESTERN see Canadian National.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for 300 tank cars of 12,500-gal. capacity.

THE ARMOUR CAR LINES, Chicago, are inquiring for 500 refrigerator car underframes.

THE BOSTON & MAINE contemplates buying about 500 hopper cars of 70 tons' capacity.

THE IMPERIAL REFINING COMPANY, Tulsa, Okla., is inquiring for 200 tank cars.

THE BUFFALO, ROCHESTER & PITTSBURGH has given a contract for making repairs to 250 hopper cars to the Pressed Steel Car Company and another contract for repairs to 250 hopper cars to the American Car & Foundry Company.

THE GREAT NORTHERN has ordered 300 ore cars from the Standard Steel Car Company. Inquiry for this equipment was reported in the *Railway Age* of August 11. This company is now inquiring for 200 general service gondola cars of 50 tons' capacity.

THE NEVADA CONSOLIDATED COPPER COMPANY has ordered 20 Ingolsby type ore cars from the Koppel Industrial Car & Equipment Company. Inquiry for this equipment was reported in the *Railway Age* of August 4.

THE CANADIAN PACIFIC has placed orders for 1500 box cars of 60 tons' capacity with the Canadian Car & Foundry Company and 1000 with the National Steel Car Corporation; orders were also placed for 200 automobile cars with the National Steel Car Corporation. The

railroad company will build 40 caboose cars at its Angus shops. This is in addition to orders for 1125 cars reported in the *Railway Age* of November 10.

THE CANADIAN NATIONAL has placed orders for 300 flat cars with the National Steel Car Corporation and for 500 ballast cars with the Eastern Car Company. This is in addition to 2880 cars recently ordered, and reported in the *Railway Age* of November 10. This company also placed orders with the Pressed Steel Car Company for 500 automobile cars for service in the United States on the Central Vermont and for 500 for service on the Grand Trunk Western.

### Passenger Cars

THE GREAT NORTHERN is inquiring for three dining cars.

THE RAPID CITY, BLACK HILLS & WESTERN is inquiring for two baggage and mail cars.

THE CANADIAN NATIONAL has ordered 10 buffet parlor cars from the Canadian Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of October 27. This is in addition to its order for 55 cars reported in the *Railway Age* of November 10.

THE CANADIAN PACIFIC has ordered 11 buffet parlor cars from the Canadian Car & Foundry Company; 15 dining cars, 2 cafe parlor cars, 2 single bed compartment cars and 50 express refrigerator cars, from the National Steel Car Corporation. This is in addition to its order for 44 cars reported in the *Railway Age* of November 10.

### Iron and Steel

THE MISSOURI PACIFIC is inquiring for 4,000,000 tie plates, of which 2,000,000 are to be of copper bearing steel.

THE CHICAGO, BURLINGTON & QUINCY has ordered 19,500 tons of rails as follows: Inland Steel Company, 4,500 tons; Illinois Steel Company, 9,500 tons and Colorado Fuel & Iron Company, 5,500 tons. This preliminary order will be followed by a larger one which will be placed later in the year.

### Signaling

THE PENNSYLVANIA has ordered from the Union Switch & Signal Company material for an electro-pneumatic interlocking at Harrisburg, Pa.; 98 working levers and 17 spare spaces. Position-light signals will be used.

### Miscellaneous

THE CANADIAN PACIFIC will build two rail hoists at its Angus shops. This company will also buy two cranes of 200-ton capacity, two pile drivers, four Jordon spreaders and one ditcher.

## Supply Trade

The General American Tank Car Corporation, Chicago, has acquired the Buffalo Steel Car Company, Buffalo, N. Y., and will operate it as a subsidiary.

The Standard Coupler Company has moved its Chicago office from 122 So. Michigan avenue to the State Bank building, La Salle and Monroe streets.

The International Derrick & Equipment Company of California, has moved its general offices from Torrance, where the plant is located, to 408 Subway Terminal building, Los Angeles, Cal. L. R. Wells, sales manager will also be located at the above address.

The Pennsylvania Pump and Compressor Company has appointed J. F. Rodgers its representative at 726 Oliver building, Pittsburgh, Pa., and Gustavo Preston its representative at 113 Broad street, Boston, Mass.

The Louisville Frog & Switch Company and the Southern Signal Corporation have merged as the Louisville Frog, Switch & Signal Company. F. W. Carter, president and general manager of both companies, has been elected president of the new company.

The American Sheet & Tin Plate Company, Pittsburgh, Pa., has adopted a new simplified branding practice for the guidance of buyers and users of its sheet and tin mill products. This simplified practice eliminates many brands that heretofore may have been confusing to the trades.

The stockholders of the Grasselli Chemical Company approved the consolidation of their company with E. I. duPont de Nemours & Company, at a meeting on November 10. An outline of the plan for the consolidation was published in the *Railway Age* of November 3.

The National Equipment Corporation, Milwaukee, Wis., has acquired the Parsons Company, Newton, Iowa, and the Insley Company, Indianapolis, Ind., following a previous acquisition of the Koehring Company, Milwaukee, Wis., and the T. L. Smith Company, Milwaukee. The Parsons and Insley companies will continue under their present management as divisions of the National Equipment Corporation. H. C. McCordell, president of the Parsons Company and W. H. Insley, president of the Insley Company, are vice-presidents and directors of the parent corporation.

The Timken Roller Bearing Company, Canton, Ohio, has a program under way to provide the necessary equipment for increasing the company's present output from 175,000 bearings a day to over 200,000 a day. About \$6,000,000 was spent during the current year to cover additions to both the steel mill and bear-

ing factory. Steel producing facilities now in operation have increased the capacity of the plant to 30,000 tons a month. The new facilities include additions to the mill at Canton and the purchase of the plant and equipment of the Weldless Tube Company at Wooster, Ohio.

Walter L. Conwell, president of the Safety Car Heating & Lighting Company, New York, has also been elected president of the Vapor Car Heating Company, Inc., Chicago, and the Vapor Car Heating Company of Canada, Ltd., to fill the unexpired term of Egbert H. Gold, deceased. Mr. Conwell was born at Covington, Ky. on January 25, 1877 and graduated from Manuel Training High school, Philadelphia and the engineering department of the University of Pennsylvania. He served with the Tennis Construction Company, railway



Walter L. Conwell

contractors, and in 1908 was appointed chief engineer. From 1901 to 1911 he was a salesman with the Westinghouse Electric & Manufacturing Company. He then served until 1916 as president of the Transportation Utilities Company, dealers in railway supplies and in 1916 was appointed assistant to the president of the Safety Car Heating & Lighting Company and since 1919 as its president. He is also chairman of the board of the Pintsch Compressing Company, president of the Safety Export Company and the Realty Securities Company, vice-president of the Ellcon Company and director of the Standard Coupler Company and of the Vapor Car Heating Company.

### Obituary

Henry Steers, president of the engineering firm, Henry Steers, Inc., New York City, died at his home in Port Chester, N. Y. on November 5. Mr. Steers, who aided in the construction of some of the most important railroads in the East, was born in New York and received his education at St. Paul's School, Concord, N. H. In 1904 he founded the engineering firm of Henry Steers, Inc., an organization which has since engaged in a wide field of en-



gineering and construction work. Mr. Steers assisted in the building of the New York, Westchester & Boston and also in extensive construction work on the Central of New Jersey, the Pennsylvania, Lehigh Valley and the New York, New Haven & Hartford.

**Frederick K. Copeland**, president of the Sullivan Machinery Company since 1892, died suddenly at Claremont, N. H., on November 10, following an attack of peritonitis. He was born in Lexington, Mass., on August 22, 1855, and graduated from the Massachusetts Institute of Technology in 1876. In the same year he entered the employ of the Chicago, Burlington & Quincy in the operating department and from 1876 to 1884 he engaged in mining engineering work in Iowa and Colorado. In 1884 he helped organize the Diamond Prospecting Company and became its president. In



Frederick K. Copeland

1892 this company and the Sullivan Machine Company were merged as the Sullivan Machinery Company with Mr. Copeland as president, which position he held until his death. He was active in numerous engineering societies and was a past president of the Engineers' Club of Chicago, of the Western Society of Engineers, and of the National Metal Trades Association. He had also served as a trustee of the Massachusetts Institute of Technology.

## Trade Publication

**THE ECONOMICS OF CULVERTS.**—The Armco Culvert Manufacturers Association has issued a bulletin of 24 pages, containing an analysis of the various considerations affecting the type of culvert to be selected for any given site. Among the factors taken into account are: The purchase price, transportation to the site, excavation, installation, maintenance and depreciation, and these are discussed with a view to a determination of the annual cost of perpetuating the culvert. While the primary object of this publication is to direct attention to the advantages of Armco corrugated metal culverts, attention is accorded to other forms of culverts and the analysis outlined is equally applicable to them.

## Construction

**BANGOR & AROOSTOOK.**—This company has awarded the contract for a new passenger station on its line at Caribou, Me., to N. W. Downing. The project will cost about \$30,000.

**CHESAPEAKE & OHIO.**—See item on Nicholas, Fayette & Greenbrier in financial news department.

**CHICAGO & NORTHWESTERN.**—Plans have been announced for the elevation of the Chicago-Omaha, Neb., main line and the addition of two main tracks in the Chicago suburban district between the present westward end of track elevation at River Forest, Ill., and the east end of Proviso yard, about 2.25 miles. The project will involve a total expenditure of about \$3,500,000 and will be completed in 1931 or 1932. Included in the work will be the widening of the Des Plaines river bridge for four tracks. At the present time there are two main tracks between River Forest and Elmhurst, Ill., which are used by both through and suburban passenger trains and the increasing of the number of tracks to four is designed to relieve congestion between those two points. It is planned to spend about \$100,000 on preliminary work during 1928. The North Western has also authorized the expenditure of about \$900,000 for the addition of a third main track between Gladstone Park, Ill., and Des Plaines, 7 miles. This work will involve the construction of an embankment from 1.5 to 5 ft. high, with the excavation of about 80,000 cu. yd. of earth, and the rearranging of platforms at a number of suburban stations. It is expected that the project will be undertaken by company forces.

**CHICAGO, ROCK ISLAND & PACIFIC.**—The Bass Construction Company, which has been awarded a contract for the construction of a passenger station at Enid, Okla., is located at Enid and not at Chicago as reported in *Railway Age* of October 27, page 831.

**ERIE.**—A contract for a new station on the New York, Susquehanna & Western at Pompton Lakes, N. J., has been awarded by this company to Oberti & Anderson, Midvale, N. J. The building will be of field stone with tile roofing. The call for bids on this project was reported in the *Railway Age* of Sept. 8.

**FLORIDA EAST COAST.**—A contract for the construction of an extension from Belle Glade-Chosen, Fla., to Lake Harbor, on the west bank of the Miami canal, 9.5 miles, has been let to the Correll-Young Company, Atlanta, Ga. The contract covers grading, construction of bridges and track laying. The total cost of the project is estimated at \$350,000.

**MISSOURI PACIFIC.**—See item in financial news department.

**MISSOURI PACIFIC.**—An expenditure of \$129,125 has been authorized for the construction of flood protection works along the Missouri river at 18 points on the Omaha division. The largest single expenditures will be made at Stella, Neb., where \$55,300 will be expended to widen embankments, raise tracks 18 in. on rock ballast, install new bridges and culverts and apply rip-rap on a three-mile stretch of track and at Reserve, Kan., where \$22,300 will be spent to install culverts, construct an intercepting drainage ditch and raise track.

**ST. JOSEPH & GRAND ISLAND.**—A contract for the construction of a two-story brick and concrete freight station at Hastings, Neb., has been let to Earl Ellis, Hastings. The cost of the station is estimated at about \$50,000.

**TEXARKANA & FORT SMITH.**—Tentative plans have been announced by the Texas lines of the Kansas City Southern for the construction of a terminal at Dowling, Tex., which is situated adjacent to the main line between Beaumont, Tex., and Port Arthur, at an estimated total cost of \$825,000. The classification yard and other facilities will involve the laying of about 20 miles of track. The mechanical facilities will include a turntable, an eight-stall roundhouse, a machine shop equipped for light locomotive repairs and a power plant, including generator, air compressor and power distribution lines. Other construction will include a storehouse with office and locker rooms, a water storage and distribution system with ample pressure for fire protection, a locomotive fuel oil and sanding plant, a storm and sanitary sewage system, a station and an office building. Authorization for actual construction of these facilities has not yet been given.

**YANKTON NORFOLK & SOUTHERN.**—See item in financial news department.

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On the D. & H. at Plattsburg, N. Y.

## Financial

**CHESAPEAKE & OHIO.—Acquisition of Control and Construction.**—See Nicholas Fayette & Greenbrier.

**CHARLESTON & WESTERN CAROLINA.—Bonds.**—This company has applied to the Interstate Commerce Commission for authority nominally to issue \$1,919,662 of series B, 5 per cent bonds representing expenditures for road and equipment in a like amount not yet capitalized.

**KANSAS CITY, MEXICO & ORIENT.—Purchase by Santa Fe Completed.**—The purchase of the Orient by the Atchison, Topeka & Santa Fe was finally completed and possession of the road transferred at Kansas City, Mo., on October 20 when W. T. Kemper, president of the Orient, received a check for \$8,600,000. The remainder of the purchase price of \$14,507,500 had previously been paid to English noteholders. Members of the Santa Fe board of directors were elected directors of the Orient at that time and W. B. Storey, president of the Santa Fe, E. J. Engel, vice-president, E. L. Copeland, secretary and treasurer, and S. T. Bledsoe, general counsel, were elected to corresponding positions on the Orient.

**MINNEAPOLIS & ST. LOUIS.—Foreclosure of Mortgage Modified.**—The recommendations of Howard S. Abbott, special master in chancery, regarding the foreclosure of mortgages on the Minneapolis & St. Louis, were modified to permit a prior lien against the White Bear branch to the Northern Pacific and were otherwise affirmed, in an order of the federal district court filed on November 16 by Judge Wilbur F. Booth. January 5, 1929, was set as the date for a hearing on the final decree of foreclosure.

Judge Booth decided that the Northern Pacific had a prior lien against the sale of the White Bear branch because it assumed a mortgage of \$200,000 in 1904, against the 12 miles of road from White Bear to east Minneapolis. Mr. Abbott had ruled in favor of the trustees of the Minneapolis & St. Louis first consolidated and first refunding mortgages, it being the contention of the trustees that the mortgage of the Northern Pacific had been merged in the title of the road which was thus free from any lien which might arise.

**MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Final Value.**—The Interstate Commerce Commission has issued a final valuation report placing a final value for rate-making purposes of \$104,910,000 on the property of the Minneapolis, St. Paul & Sault Ste. Marie owned and used for common carrier purposes, as of June 30, 1916. Cost of reproduction new of the carrier's owned and used property is estimated at \$108,619,490, and cost of reproduction less depreciation at \$89,286,211. In addition to the above a final value of \$46,040,000 is placed on the owned and used property of the Wisconsin Central

Railway, as of June 30, 1917. Cost of reproduction is estimated at \$48,177,188, and cost of reproduction less depreciation at \$37,686,374. A final value of \$5,290,000 is put on the property owned but not used by the Central Terminal Railway, as of June 30, 1917; and \$560,000 on the property owned but not used by the Gogebic & Montreal River Railway, as of the same date. The value of the property owned and used by the Wisconsin & Northern Railroad is found to be \$1,934,100, as of June 30, 1917; and the property used but not owned by the Minnesota Northwestern Electric Railway is valued at \$209,000, as of June 30, 1916. The Soo line had on valuation date an outstanding capitalization of \$125,516,700. The book investment in road and equipment was \$116,953,635, which would be reduced to \$109,650,209 if readjustments were made in accordance with the Commission's accounting examination. The present value of lands and rights owned and used by the Soo for carrier purposes was found to be \$7,197,199.

**MISSOURI PACIFIC.—New Director.**—John R. Flippin, of Memphis, Tenn., vice-president of the Federal Compress and Warehouse Company and a director of the Nashville, Chattanooga & St. Louis, has been elected a director.

**MISSOURI PACIFIC.—Bonds.**—This company has been authorized by the Interstate Commerce Commission to issue \$30,000,000 of first and refunding mortgage 5 per cent bonds, series G. Bonds to the amount of \$25,000,000 are to be sold at not less than 96½ per cent of par and accrued interest and the proceeds used in the payment of short term notes, for working capital and for capital expenditures. The remaining \$5,000,000 of bonds are to be pledged and replighted from time to time to December 31, 1930, as collateral security for short term notes.

**NEW YORK CENTRAL.—Acquisition of Control.**—See Nicholas Greenbrier & Eastern.

**NEW YORK, CHICAGO & ST. LOUIS.—Bonds.**—This company has applied to the Interstate Commerce Commission for authority to sell to the Guaranty Company of New York at not less than 91 and interest, an issue of \$11,275,000 of 4½ per cent refunding mortgage bonds, the issue of which had been authorized by the commission. The proceeds are to be used to pay off short-term notes and provide additional working capital.

**NICHOLAS FAYETTE & GREENBRIER.—Construction and Securities.**—The Interstate Commerce Commission has authorized this company to construct a line from a connection with the New York Central at Swiss, W. Va., easterly to a connection with the Loop & Lookout Railroad at Nallen, twenty-nine miles; the New York Central and the Chesapeake & Ohio being authorized to acquire control of this company by the purchase of \$400,000 of capital stock, which the Commission has authorized, and also of \$3,600,000 of promissory notes and by lease. The Chesapeake

& Ohio has been authorized to construct a one-quarter mile line including a bridge to connect the Kanawha & West Virginia at Beech Glen and to operate over the Kanawha for two miles to a connection with the Nicholas Fayette & Greenbrier.

**OREGON SHORT LINE.—Operation Over Western Pacific Trackage.**—This company has applied to the Interstate Commerce Commission for authority to operate jointly with the Western Pacific over a projected connecting track between the lines of the two companies at Wells, Nevada.

**PENNSYLVANIA COMPANY.—Bonds.**—Kuhn, Loeb & Co. are offering \$50,000,000 bonds of this subsidiary of the Pennsylvania Railroad. These bonds will bear interest at 4¾ per cent, mature in 35 years and are offered at 99 and accrued interest. They will be secured by a pledge of Norfolk & Western common stock, which shares have a market value of \$64,000,000.

**PITTSBURG & WEST VIRGINIA.—Inter-vention.**—The Interstate Commerce Commission has authorized the Business Protective League to intervene in the proceeding involving authority of this company to construct the Connellsville extension.

**ROCK ISLAND.—Construction.**—This company and the Kansas City Short Line Railroad have applied to the Interstate Commerce Commission for authorization to construct an extension from Coburn to Birmingham, Mo., 84 miles, connecting with the Chicago, Burlington & Quincy, which the Rock Island now uses, and affording access to the road of the Kansas City Terminal Company. Authority also was sought on behalf of the Short Line to operate over the Rock Island's main line from Allerton, Iowa, to Coburn, Mo., 54 miles, so that the new line will constitute a connecting extension of its present line.

**SEABOARD AIR LINE.—Acquisition of Control of Seaboard-All Florida.**—The Interstate Commerce Commission has authorized this company to amend the leases by which it operates the all Florida, the Florida Western & Northern and the East & West Coast to conform with the lease of the Charlotte Harbor & Northern and other subsidiaries as recently amended.

**ST. JOHN & OPHIR.—Abandonment.**—The Interstate Commerce Commission has authorized this company to abandon as to interstate and foreign commerce its 8.5-mile line in Tooele County, Utah.

**ST. LOUIS-SAN FRANCISCO.—Examiner Opposes Capitalization of Unauthorized Investments.**—The Interstate Commerce Commission has made public a proposed report on the application of the St. Louis-San Francisco Railway for authority to issue \$8,000,000 of consolidated mortgage 4½ percent gold bonds as collateral for short term notes in which Examiner A. C. Devoe recommends that such authorization should be granted only on the express condition that "out of its treasury as reimbursed by the proceeds of the pledge or



pledges of the bonds, an amount equal to the proceeds should immediately upon such reimbursement be deposited and held, until expended, in a separate fund, and should be expended by the applicant solely for acquisition, construction, completion, extension, or improvement of facilities, for additions and betterments to its property, or for the acquisition of new equipment, after January 1, 1928." As part of the basis for the issue of the proposed bonds, the railroad company submitted \$5,000,000 of two-year secured gold notes, or short term notes issued to provide for their payment at maturity. These notes were issued in connection with the acquisition in 1926 of 183,333 shares of the common stock of the Chicago, Rock Island & Pacific. The issue of consolidated mortgage bonds is proposed by the Frisco to capitalize part of its expenditures for equipment. As of July 31, 1928 the total book value of this equipment, as reported in the examiner's report, was \$23,263,478, the total obligations issued in respect thereof \$20,383,500, the installments paid \$9,705,500, the obligations outstanding \$10,678,000, and the road's equity in the equipment \$12,585,478. With reference to the Frisco's claim that its Rock Island stock is a proper basis for the issue of its stock or bonds, inasmuch as its holdings are pledged under its prior lien mortgage and the consolidated mortgage, and the proceeds of the stock, if sold, must be applied either to the retirement of bonds or to capital expenditures, the examiner's report states:

In the present case the applicant admits that its holdings of Rock Island common stock are insufficient to give it control of that company and it has not been shown that such holdings will probably be permanent. The applicant acquired the 183,333 shares of Rock Island common stock without the commission's authority, presumably as a step toward acquiring control of that company. If carriers use their resources and credit to acquire the stocks of other carriers without first obtaining such authority, they do so with the knowledge that it may not be granted and that until it is granted and the conditions above indicated fulfilled, that their investments in those securities can not be used as a basis for capitalization. Therefore, the commission should not authorize the issue of consolidated mortgage bonds in respect of the \$5,000,000 of two year secured gold notes, or short-term notes issued to provide for their payment. Any consolidated mortgage bonds that the commission may authorize to be issued under the present application should be issued solely in respect of the expenditures made in connection with the acquisition of the equipment.

**READING.—Acquisition of Control.**—This company has applied to the Interstate Commerce Commission for authority to acquire control and operate as a part of its system under operating contracts 10 subsidiary companies, with a mileage of 341 miles, whose capital stock is owned by the carrier in large part or its entirety. The object sought is to avoid the expenses incurred in separate accounting and inter-company billing. The companies with which the Reading has negotiated operating contracts are the Catasauqua & Fogelsville Railroad; Gettysburg & Harrisburg Railway; Northeast Pennsylvania Railroad; Perkiomen Railroad; Philadelphia & Chester Valley Railroad; Philadelphia, Newton & New York Railroad; Pickering Valley Railroad; Reading & Columbia Railroad; Stoney Creek Railroad; and Williams Valley Railroad. The Reading has also applied for authority to acquire the line of the Bloomsburg & Sullivan Railroad,

extending from Bloomsburg to Benton, Pa., 20 miles, recently purchased at public sale for \$70,000.

**READING.—North Pennsylvania Bonds.**—The Interstate Commerce Commission has authorized the North Pennsylvania to extend from November 1, 1928, to November 1, 1978, the maturity date of \$408,000 of its 4 per cent bonds, to be guaranteed by the Reading, the lessee company.

**TEXAS & PACIFIC.—Control of Texas New Mexico.**—The Interstate Commerce Commission has authorized this company to acquire control of the Texas-New Mexico by the purchase for cash of \$500,000 of stock which the commission has authorized the latter company to issue.

**WABASH.—Bonds.**—The Interstate Commerce Commission has modified its decision of September 20, 1926, authorizing the issuance by this company of \$15,500,000 refunding and general mortgage 5 per cent bonds, series B, to permit a part of the proceeds to be used for additions and betterments.

**YANKTON, NORFOLK & SOUTHERN.—Construction authorized.**—The Interstate Commerce Commission has authorized this company to construct a 65-mile line from Yankton, S. D., south to Norfolk, Neb. The estimated cost of construction is \$2,200,000 and of equipment \$125,000.

### Dividends Declared

Alabama Great Southern.—Common, \$2.00, semi-annually; common, extra, \$1.50; both payable December 28 to holders of record November 28. Preferred, \$2.00, semi-annually; preferred, \$1.50, extra, both payable February 13 to holders of record January 11.

Catawissa.—Preferred, \$1.25, payable November 22 to holders of record November 12.

Chicago & North Western.—Common, \$2.00, semi-annually; common, extra, \$1.50; both payable December 31 to holders of record December 9. Preferred, \$3.50, semi-annually, payable December 31 to holders of record December 3.

Cleveland & Pittsburgh.—Special guaranteed, \$50, quarterly; guaranteed, \$87½; both payable December 1 to holders of record November 10.

Georgia, Southern & Florida.—First preferred, \$2.50, semi-annually; second preferred, \$2.50, semi-annually; both payable November 28 to holders of record November 14.

North Pennsylvania.—\$1.00, quarterly, payable November 26 to holders of record November 19.

Pere Marquette.—Common, \$1.50, quarterly, payable January 2 to holders of record December 7. Prior preferred, \$1.25, quarterly; 5 per cent preferred, \$1.25, quarterly; both payable February 1 to holders of record January 4.

Pittsburgh, Bessemer & Lake Erie.—Preferred, \$1.50, payable December 1 to holders of record November 15.

Rutland.—Preferred, \$1.00, payable December 15 to holders of record November 30.

St. Louis-San Francisco.—Common, \$1.75, quarterly; common, extra, \$25; both payable January 2 to holders of record December 3; preferred, \$1.50, quarterly, payable May 1 to holders of record April 2; preferred, \$1.50, quarterly, payable August 1 to holders of record July 1; preferred, \$1.50, quarterly, payable November 1 to holders of record October 1.

Southern Pacific.—1½ per cent, quarterly, payable January 2 to holders of record November 28.

Union Pacific.—Common, 2½ per cent, quarterly, payable January 2 to holders of record December 1.

Virginian.—Common, \$7.00, annually, payable January 31 to holders of record December 8.

### Average Price of Stocks and of Bonds

	Nov. 13	Last week	Last year
Average price of 20 representative railway stocks..	127.31	123.38	120.64
Average price of 20 representative railway bonds..	94.50	94.37	96.99

## Officers

### Executive

**Fred Lavis**, consulting engineer, New York, was on November 7 elected president and a member of the board of directors of the International Railways of Central America, succeeding **Minor C. Keith**, who was elected chairman of the board. Mr. Lavis was born in England in 1871 and came to the United States in 1887. After a year in a surveyor's office in Boston he entered the service of the Boston & Maine as an inspector in the engineering department. A year later he served as rodman and transitman on the construction of a harbor and railroad at Sigua, Cuba, his first introduction to railway work in Latin America, with which he has since been closely identified. During the next 15 years he served in various positions connected with the location and construction of railroads in the United States, Mexico and Central and South America, and in 1906 published a treatise on railroad location, entitled "Rail-



Fred Lavis

road Location, Surveys and Estimates". He was resident engineer on the construction of the Pennsylvania tunnels into New York, and since their completion in 1909 has practiced as a consulting engineer, specializing in economics of transportation, finance, location and construction of railroads. During the latter period he was chief engineer of the Argentine Railway Company, consulting engineer to the government of Bolivia, consulting engineer to the American International Corporation, and other corporations, and has made examinations of railway projects and properties in Spain, Italy and South America, as well as the United States, for financial houses and others. During the past four years he has devoted practically all his time to the design and construction of the super-highway which the State of New Jersey has been building through the congested areas of Northern New Jersey, in Jersey City

and Newark, to connect with the Holland vehicular tunnels under the Hudson. This highway is being built for the heaviest traffic through a congested district of difficult topography and eight miles of it will cost \$20,000,000. Mr. Lavis is the author of "Railway Estimates" (1917), "Instructions to Locating Engineers" (1919), "Subway Construction in New York" (1915), and of several technical papers presented to the American Society of Civil Engineers, several to the International and Pan-American Congresses, and other scientific bodies. He has written extensively for the technical press on engineering subjects and is a member of several of the engineering societies. His first connection with the properties which now form part of the International Railways of Central America was in 1911, when he made an examination of them for the National City Bank of New York. Later in 1916, he again studied these properties and he has been consulting engineer of the executive committee of the board of directors for the past two years. During this period he has made examinations of the property and advised particularly in the matter of construction of the connecting link between Guatemala and Salvador, and in regard to additions and betterments to the operated lines.

Mr. Keith, who has been elected chairman of the company, was born in Brooklyn, N. Y., on January 19, 1848. He was engaged in the lumber business until 1870 which was followed by two years in the cattle business in Texas. He then went to Costa Rica where he engaged in railroad construction and public improvements for several years. Mr. Keith organized the United Fruit Company in 1899 later concentrating attention on railroad developments. Mr. Keith built up the International Railways of Central America from almost nothing to its present position as by far the largest American owned railroad outside the United States; this accomplishment being the more remarkable since it was brought about during a period when American capital was very chary of going into foreign investments. Mr. Keith is also president of the Atlanta & St. Andrews Bay, the Guatemala Central and the St. Andrews Lumber Company.

### Financial, Legal and Accounting

**George Giugliano**, traffic manager of the Kosciusko & South Eastern, has been appointed treasurer, with headquarters as before at Louisville, Ky.

**A. A. Pinkney** has been appointed comptroller and **E. W. Shell** has been appointed treasurer of the Algoma Eastern, with headquarters at Sault Ste. Marie, Ont.

**Conrad Olson**, former judge of the Municipal Court of St. Paul, Minn., and a senator in the Minnesota legislature,

has been appointed general attorney of the Northern Pacific, with headquarters at St. Paul.

### Operating

**L. S. Bourne**, general manager of the Rio Grande Railway, with headquarters at Brownsville, Tex., has been appointed general manager of its successor, the Port Isabel and Rio Grande Valley.

**H. L. Wheeler**, supervisory engineer of the San Joaquin & Eastern, has been appointed superintendent, with headquarters as before at Auberry, Cal., succeeding **W. H. Dresser**, who has retired from active railway service.

**W. E. Kingston**, assistant superintendent of the Portage division of the Canadian Pacific, has been transferred to the Winnipeg Terminal division, with headquarters at Winnipeg, Man., replacing **W. F. Tully**, who has been transferred to the Portage division, with headquarters as before at Winnipeg.

**Henry B. Lautz**, who has been promoted to assistant general manager of the Northern district of the Atchison, Topeka & Santa Fe, with headquarters at La Junta, Colo., has been in the service of that railway for more than 38 years. He was born at Pekin, Ill., on August 2, 1876, and attended the public schools at Topeka, Kan., then entering railway service at the age of 14 years



Henry B. Lautz

as a messenger in the telegraph department of the Santa Fe. From September, 1891, to December, 1900, Mr. Lautz occupied various positions in the office of the general manager and during 1901 he acted as a clerk in the office of the president. He was then advanced to chief clerk to the general manager and in July, 1905, he was promoted to assistant to the general manager. In December, 1916, he was again promoted to superintendent of the Middle division, with headquarters at Newton, Kan., where he remained until his promotion to assistant general manager of the Northern district, which became effective on November 10.

**Almon A. Gist**, who has been promoted to superintendent of the Southern Kansas division of the Atchison, Topeka & Santa Fe, with headquarters at Chanute, Kan., was born on June 7, 1870, on a farm near Sabetha, Kan. He attended the Kansas State Agricultural College from 1886 to 1891 and in June of the latter year he entered railway service as an agent and operator on the Kansas division of the Union Pacific, where he remained until 1898 when he became a clerk in the transportation de-



Almon A. Gist

partment of the War department. Mr. Gist first entered the service of the Santa Fe in April, 1905, as an operator and ticket clerk on the Oklahoma division. Later he was advanced to agent and served at various stations until July, 1909, when he was advanced to chief clerk to the superintendent. In August, 1911, Mr. Gist was promoted to trainmaster on the Oklahoma division, being transferred to the Southern Kansas division at Chanute in August, 1917. His promotion to superintendent became effective on November 10.

### Traffic

**George W. Hart**, has been appointed traffic manager of the Port Isabel & Rio Grande Valley, with headquarters at Brownsville, Tex.

**Paul Burlingame**, treasurer of the Kosciusko & South Eastern, has been appointed traffic manager, with headquarters as before at Louisville, Ky.

**S. S. Senne**, commercial agent for the Louisiana Railway & Navigation Company at St. Louis, Mo., has been promoted to assistant general freight agent, with headquarters at the same point.

**J. C. Weaver**, livestock agent of the Gulf Coast Lines, the International-Great Northern and other Missouri Pacific subsidiaries in Texas, has been promoted to general livestock agent, with headquarters at before at Houston.

The position of general agent on the Seaboard Air Line at Tallahassee, Fla., has been abolished effective November 1. **O. O. Walters**, commercial agent,



assumes jurisdiction over freight traffic solicitation, service and similar matters, reporting to the assistant freight traffic manager.

**G. Hiam**, division freight agent on the Canadian Pacific at St. John, N. B., has been appointed assistant general freight agent, with headquarters at Montreal, Que. He will be succeeded as division freight agent by **K. Elliott**, division freight agent at Regina. **D. A. McColl** has been appointed district freight agent, with headquarters at London, Ont., succeeding **W. J. Anderson**, promoted.

**E. G. Baker**, assistant general passenger agent of the St. Louis-San Francisco at Kansas City, Mo., has been appointed assistant general freight and passenger agent at the same point. **F. J. Lawler**, division freight agent at St. Louis, Mo., has been promoted to assistant general freight and passenger agent at that point. **A. S. Owen**, district passenger agent, has been promoted to assistant general eastern agent, with headquarters as before at New York. **Charles Thorburn**, general agent in the freight department at Atlanta, Ga., has been transferred to Minneapolis, Minn., and the jurisdiction of **J. B. Morrow**, general agent in the passenger department at Atlanta, has been extended to include the freight department. **C. C. Mosley**, district freight agent at Jacksonville, Fla., **George M. Forrester**, commercial agent at Springfield, Mo., **T. H. Banister**, commercial agent at Memphis, Tenn., **W. H. Crow**, division freight and passenger agent at Pensacola, Fla., and **O. H. Reid**, commercial agent at Tulsa, Okla., have been promoted to general agents at those respective points. **F. R. Newman**, division passenger agent at Joplin, Mo., has been promoted to general agent at Kansas City.

**Dan F. McDonough**, who has been promoted to traffic manager of the



Dan F. McDonough

Fourth district of the St. Louis-San Francisco, with headquarters at Birmingham, Ala., has been in the service

of that railroad and a road which was merged with it, the Kansas City, Memphis & Birmingham, for more than 23 years. He was born in January, 1871, at Syracuse, N. Y., and entered railway service in 1895 on the K. C., M. & B. Five years later he was advanced to traveling freight agent at Atlanta, Ga., then advancing to commercial agent at Birmingham in 1905, division freight agent at the same point in 1909, and inspector of transportation at Springfield, Mo., in 1918. From March, 1920, to May, 1928, Mr. McDonough served as division freight agent at Joplin, Mo., for six months and at Birmingham the remainder of the time. He was then promoted to executive general agent of the Frisco at Memphis, Tenn., his further promotion to traffic manager becoming effective on October 15.

## Mechanical

**Frank A. Beyer** has retired from active railway service as superintendent of the west shops of the St. Louis-San Francisco, with headquarters at Springfield, Mo.

**F. D. Smith**, traveling fireman on the Manitoba district of the Canadian National, with headquarters at Sioux Lookout, Ont., has been promoted to master mechanic at Rainy River, Ont.

**Carl W. Frey**, who has been promoted to master car builder of the Michigan Central at Detroit, Mich., has been in the service of that company for about 16 years. He was born on March 11, 1888, at Sandusky, Ohio, and graduated from the high school in that city, entering railway service in June, 1902, as a laborer and material carrier on the Lake Shore & Michigan Southern (now part of the New York Central). During 1904 he was employed as a clerk and stock keeper and for the following 11 years he served successively in the car repair department of the L. S. & M. S., as a piece work inspector on the Lake Erie & Western (now part of the New York, Chicago & St. Louis), as general work inspector on the Wheeling & Lake Erie and the Michigan Central and as chief contract inspector on the latter road. In October, 1916, Mr. Frey was advanced to assistant general foreman on the Michigan Central and to general foreman in August, 1917. He was promoted to superintendent of shops at West Detroit, Mich., in February, 1922, his further promotion to master car builder becoming effective on October 16.

## Signaling

**Arrington A. Wood**, assistant signal supervisor on the Boston & Maine, with headquarters at Concord, N. H., has been appointed signal supervisor, with the same headquarters, succeeding **G. C. Ketchum**. He will in turn be succeeded by **Carl T. Smith**.

## Special

**C. W. Crawford**, chairman of the general committee of Division II—Transportation, American Railway Association, with headquarters at Chicago, has resigned, effective December 1, to become vice-president and general manager of the International Seal & Lock Company, Hastings, Mich. Mr. Crawford is also chairman of the Per Diem Rules Arbitration committee of the A. R. A. He was born at Chatfield, Minn., on January 11, 1882, and attended McAlester College, St. Paul, Minn. He entered railway service in 1902 in the local freight office of the Chicago & North Western at Chicago, later serving in the general freight department of the same railroad. In 1907 Mr. Crawford was appointed chief clerk to the general agent of the Chicago, Indianapolis & Louisville at Chicago and for a short



C. W. Crawford

time he was with the American Steel Foundries, where he remained until he became assistant to the general agent of the American Railway Association at Chicago in 1912. Later he was appointed assistant to the chairman and in 1919 he became chairman of the general committee. During federal control of the railroads Mr. Crawford served with the Troop Movement section of the A. R. A. and with a committee on relations between the railroads and the Railroad Administration at Washington, D. C. For the past two years he has been chairman of a special A. R. A. committee in charge of the defense of the per diem rules in the car hire investigation of the Interstate Commerce Commission.

## Obituary

**A. E. Ruffer**, assistant vice-president on the Erie, with headquarters at New York, died at St. Marys Hospital, Passaic, N. J., on November 14, after a short illness.

**Robert L. Milton**, superintendent of the Kansas City, Mo., terminals of the

Wabash from 1912 to 1918, died at his home in that city on November 12, at the age of 67 years. Mr. Milton retired from active railway service in 1925.

**Arthur B. Merrick**, who was cashier of the Gulf, Colorado & Santa Fe, with headquarters at Galveston, Tex., from 1897 until his retirement in 1919, died at the John Sealy hospital at Galveston on November 7 at the age of 62 years.

**William A. Curley**, master mechanic of the Little Rock division of the Missouri Pacific, with headquarters at McGehee, Ark., died in the Missouri Pacific hospital at St. Louis, Mo., on October 27, following a protracted illness.

**Thomas F. Butler**, who retired as master mechanic of the Indianapolis division of the Pennsylvania in 1924, died at his home in Columbus, Ohio, following a stroke of apoplexy, on November 7. Mr. Butler had been master mechanic of the Indianapolis division for 20 years and previous to 1903 had served as master mechanic from 1890 to that time at Crestline, Ohio, Wellsville and Columbus.

**S. C. Fleetwood**, for many years auditor of disbursements for the New York, New Haven & Hartford, died at his home in West Haven, Conn., on November 13. Mr. Fleetwood had been in the service of the New Haven since 1872 having served in various capacities until 1887, when he was appointed auditor of disbursements. He held this position until December, 1915, when after completing forty-five years of service, he was assigned to special duties in the comptroller's office.

**Frank W. Stevens**, consulting valuation counsel of the New York Central Lines, died on November 8 at Covina, Cal. Mr. Stevens was born on December 16, 1847, at Leon, N. Y., and educated at Harvard Law School. He entered railway service in September, 1885, as attorney for the Chautauqua Lake Railway (now the Jamestown, Westfield & Northwestern) and its successors. From 1890 to 1907 he was also attorney for the Dunkirk Allegheny Valley & Pittsburgh. He served as chairman, Second District, New York Public Service Commission from July 1, 1907, to May 2, 1913, and in July of the same year he was appointed general valuation counsel for the New York Central Lines at New York. He served in the latter position until the end of 1924, when he was appointed consulting valuation counsel.

**George A. Poore**, industrial development agent for the Eastern portion of the New York, New Haven & Hartford and former superintendent of the Providence division of that road, died at the Jane Brown Memorial Hospital, Providence, on November 6, after a brief illness. Mr. Poore was 61 years of age and had been in railway service since 1889. His first position was with the Illinois Central, where he served as

clerk in the superintendent's office. He later served in various other positions on that road. He was chief clerk to the general superintendent of the Delaware, Lackawanna & Western from 1900 to 1904, when he was appointed division superintendent for the same road. He entered the service of the New York, New Haven & Hartford in February, 1913, as chief clerk to the general manager and in January, 1917, he was appointed superintendent of the Providence division. In the fall of 1925 he was appointed industrial development agent.

**Charles A. Pigford**, who retired from active railway service as superintendent of the Gulf, Mobile & Northern, with headquarters at Laurel, Miss., in 1921, died at his home in Memphis, Tenn., on November 10 at the age of 73 years. From 1890 to 1899 Mr. Pigford was roadmaster on the Mobile & Ohio at Mobile, Ala., and he then became supervisor of trains and track of the Mobile & Bay Shore (now part of the Mobile & Ohio) at Coden, Ala. In 1904 he was appointed superintendent of the M. & O., with headquarters at Mobile, and was transferred to Meridian, Miss., in the following year. During federal control of the railroads he served as operating officer of the Meridian Terminals, in addition to being superintendent of the Mobile & Ohio. Mr. Pigford was appointed superintendent of the Gulf, Mobile & Northern in 1920.

**Robert Hamilton Allison**, general manager of the Western lines of the Atchison, Topeka & Santa Fe and vice-president and general manager of the Panhandle & Santa Fe, with headquarters at Amarillo, Tex., died at the Billings Memorial hospital at Chicago on November 10, following an illness of



Robert Hamilton Allison

nearly two months. Mr. Allison was granted a leave of absence on November 1. He was born at Glad Spring, Va., on August 8, 1871, and entered railway service at the age of 16 years as a warehouseman on the Norfolk & Western. When 20 years old he was advanced to

dispatcher, then becoming a dispatcher on the Chicago & Alton in February, 1898. Late in that year Mr. Allison accepted a similar position on the Chicago & North Western, being advanced to chief dispatcher in April, 1899, where he remained until January, 1902, when he became a trick dispatcher on the Santa Fe. A year later he was promoted to chief train dispatcher and in 1905 he was further promoted to trainmaster at Chillicothe, Ill. From 1914 to 1920 he served successively as superintendent at Marcelline, Mo., and at Chillicothe and he was then promoted to assistant general manager of the Eastern district of the Santa Fe, with headquarters at Topeka, Kan. Mr. Allison had been general manager of the Western lines since March, 1927.

**John S. Sneyd**, assistant treasurer of the Reading, died on November 12 at his home in Roxborough, at the age of 69. Mr. Sneyd entered the service of the Reading as an office boy at the age of 13, three years later he became clerk in the passenger department and in 1902 he was promoted to chief clerk. He was later appointed assistant treasurer, serving as federal treasurer during the United States Railroad Administration and again serving as assistant treasurer at the end of federal control, which position he held up until the time of his death.

A NEW INTERNATIONAL RAILWAY LINK was established on Nov. 1, with the completion of the Nice-Coni line, about 63 miles in length, joining the French and Italian cities and affording a short line transportation route across the border between the two countries.

Negotiations have been under way between the two governments for the building of the road since 1904, but the war and post war circumstances prevented its completion until this year.

The new link just completed connects Nice with Viveola, Italy, passing through the Alpine mountains and traversing some of the roughest country in the world. Due to this latter fact, it was necessary to construct 45 tunnels aggregating about 143 1/4 miles, the longest of which is 3 3/4 miles. There also are many bridges and viaducts made necessary by valleys and ravines. The nature of the country presented a number of engineering problems. One of the most serious of these difficulties was the nature of the soil which over a wide area of the line is of chalky substance, tending to cause landslides and necessitating the building of strong retaining walls, foundations and deep drainages. A large deposit of sulphate of lime presented chemical difficulties resulting in the use of specially mixed cement for all masonry work. Thus, the cost of the work on the final link reached an average of approximately \$442,000 per mile and a total expenditure of some \$17,639,150 was involved in the project. It is anticipated that the whole route will eventually be electrified.